

Marine Engineering And Shipping Age

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As Others See Us

SOMETHING over two months ago the writer was privileged to attend the trials of a new British motor-ship. The ship, though not of large size, was of somewhat unusual design and very completely equipped. She had been built and engined by one of the largest and most successful British shipbuilding firms. It is perhaps needless to say that the trial was an entire success, the ship and her machinery functioning perfectly.

For an American, interest in this trial centered not so much in the vessel herself as in the small party of guests who happened to be aboard. This party included several prominent British shipowners, among their number one of the largest and best known operators of merchant ships, both cargo and passenger, in the British Isles. There being an American in the party, American shipping quite naturally came up for discussion, forming in fact the principal subject of a long talk around the dining table during and after lunch, in which all hands took a more or less active part.

The views of the great shipowner, while perhaps not expressing anything not already pretty well appreciated on this side of the water by those who have a full and unbiased understanding of our present shipping situation, are, none the less, of surpassing interest as expressing the well weighed opinions of a very prominent foreign shipowner, one whose deep and thorough knowledge of the business in which he is engaged is not surpassed by that of any of his countrymen.

In effect these views were as follows: British ship-owners, in common with all others, are human; they are

not in business for their health and consequently nothing would please them better than to have all foreigners, including the United States, get off the ocean and leave overseas trade to their tender mercies. They have, however, a very friendly feeling for America as a country and realize the necessity of her holding at least a portion of her overseas trade for her own ships, in other words having some voice as to the freight rates on and the control of her exports to foreign countries. They feel, apparently much more keenly than we do, the importance of a merchant marine as the necessary background for an efficient navy and the absolute necessity, to every country which wishes to hold a place on the sea in times of stress, of a mercantile fleet. They are opposed most strongly to government ownership and operation of merchant vessels, particularly in the United States as this has brought them competition which so far as they can see would not otherwise have existed, but on the other hand they admit that it is not apparent to them how, unaided, privately owned American vessels could successfully compete with them in overseas trade. As one of the party said, "Of course, we can't compete with the United States government, but private American competition, with things as they now stand, is a different matter." It is their opinion that American competition, so far as they are concerned, is something which "cannot be cured and must be endured" so long as it lasts. In the meantime they are comforting themselves with the certain knowledge that unless America soon settles down to a fixed policy and commences to build ships, their period of "enduring" will in time, and not so long a time, come to an end. In the words of the leader of the party, "We have finally come to look upon your shipping competition as a temporary matter, for nothing is clearer than that in a few years, ten at the outside, your ships will have ceased to trouble us *unless* you start, and start very soon, to build new, competitive vessels. We are replacing obsolete tonnage as fast as we can afford to; you will have to do the same or retire from the business."

A further fact, which was dwelt upon at some length was the service rendered to Germany by the Allies in taking away from her a large proportion of her old and obsolete tonnage—and thus pressing upon her the necessity of building new and modern vessels. It is to meet the coming competition of the new ships building in Germany and elsewhere on the continent that Great Britain is devoting all her energies. She looks for us to drop out, in the not very dis-

tant future, as a factor in the world's overseas shipping.

As was stated at the beginning of this article, there is not anything here expressed which comes as a new thought to those of us who have read the various marine publications of this country and kept abreast of the men who are honestly striving to place American shipping on a firm basis. Although these statements may appear but an expression of truisms, nevertheless, coming as they actually did from the lips of eminent and successful British ship-owners, they assume added and greater importance, and may well be pondered over by the authorities who, for the time being at least, hold in their hands the destinies of our ocean shipping.

The Contrapropeller

IN view of the considerable extent to which the contrapropeller is being adopted in this country a discussion which recently took place at a meeting of the German Institution of Naval Architects is of interest.

The discussion was opened by a paper on the various propeller guiding devices and stream line rudders which have recently come into prominence, particular attention being devoted to the inventions of Mr. Anton Flettner, Dr. Wagner, Dr. Oertz and Professor Hass. The fact that this paper was prepared by Dr. Kempf, the director, of the Hamburg Experimental Tank, is a sufficient guarantee of its accuracy and thoroughness. Additional interest was lent to the meeting by the presence of all of the inventors whose work was under discussion.

Dr. Kempf stated that the original contrapropeller consisted of 4 or 6 blades abaft the propeller and gave an average saving of from 10 to 12 percent in power. It was found, however, that the side blades contributed a relatively small proportion of this saving, the vertical elements, or guiding devices, attached to the rudder post in themselves being responsible for a saving of 10 percent. The latter, the invention of Dr. Wagner, has been supplemented by Professor Hass with guiding blades ahead of the propellers, thus making possible the application of guiding devices to twin and quadruple screw vessels in the form of blades welded to the strut or spectacle frame bosses. Experience with the Hass contrapropeller has shown a saving in power of 8 to 10 percent in single screw and 5 to 7 percent in twin screw vessels for equal speeds and drafts. All these figures coincide with results obtained in the model basin.

Three German inventors have directed their attention to the design of rudders with a view to improving propeller efficiency as well as steering. The Flettner rudder, introduced in 1917, was the first stream line rudder designed especially to improve steering. In 1920 Dr. Wagner proposed, in addition to his patent rudder post, a special design of rudder to eliminate eddies in front of the propeller, in this way increasing the efficiency of the stern post guiding device. In 1923 Dr. Oertz proposed a rudder similar to the Flettner, but not built as a balanced rudder, the principle being not unlike the Wagner rudder, but without guide blades at the head of the rudder post. All three of these inventions are in practical use.

Dr. Kempf expressed the opinion that these modern rudders in connection with contrapropeller devices ahead and astern of the propeller would give the most successful results.

Dr. Oertz did not take part in the discussion of the paper but a Mr. Schwarz, who was present, stated that the fitting of an Oertz rudder on the Hamburg American liner *Steigerwald* had shown a saving of over 35 percent and that the later addition of a Hass guide blade ahead of the propeller had reduced this amount.

Evidently Mr. Schwartz's information had come from unreliable sources as Dr. Goos, the marine superintendent of the Hamburg American line, stated that the actual improvement due to fitting the Oertz rudder on the *Steigerwald* had been 7.3 percent and that this was later increased by 6.4 percent through the fitting of a Hass blade ahead of the propeller.

Chief Engineer Müller of the Hamburg-South America line stated that the fitting of guiding devices on the twin screw ships of his company had undoubtedly effected a saving of 7 or 8 percent.

In closing the discussion Dr. Eng. Ernst Foerster, the distinguished naval architect, strongly deprecated any tendency to exaggerate the possible benefits of their various inventions. The actual results were highly satisfactory and exaggerations or unreliable statements could in the end only do harm and delay rather than accelerate progress and development.

The Future and the Shipping Board

THERE is little doubt but that everyone connected with the shipping enterprises of this country, be the latter privately owned or in the possession of and controlled by the government, will agree most heartily with the statement made not long since by Captain Robert Dollar at the National Foreign Trade Convention at Detroit that "the Shipping Board must decide whether it is going to stay in or get out of the shipping business."

While it may be suggested that this decision is one which does not altogether rest with the Shipping Board—Captain Dollar would perhaps have been closer to the root of the matter if he had said government rather than Shipping Board—the essential facts are the same, in either case; uncertainty, wabbling and the apparent inability of the board to say "yes" or "no" when confronted by the necessity of settling any really important matters of policy or action must give place to stability of action and some degree of certainty as to present and future policy.

The Congress has directed the board to report on the whole situation and this it has done to the best of its ability. This report, as have others which preceded it, makes clear the necessity of new vessels in the very near future if we are to retain our place in the overseas trade of the world. How and by whom are these new vessels to be built? This is the vital question, outweighing in importance all others. If new ships are not forthcoming, controversy as to ownership, management, or shipping policy is of small importance. At the present rate of progress these matters may

perhaps be adjusted at about the time our present fleet finally leaves the seas to the undisputed possession of its modern and more efficient foreign competitors. The board alone cannot settle this matter; it has no authority to construct new vessels. However much it may appreciate their necessity, it can only recommend, it can not authorize, ship-building. In authorizing the installation of Diesel engines on certain of its vessels it has gone to the limit of its authority, so far as modernizing its fleet and providing for the future are concerned. As to the wisdom of expending large sums in the attempt to modernize vessels which, in certain rather essential particulars, are approaching obsolescence if they have not already reached it, there is great difference of opinion. The same amount of money invested in new vessels would undoubtedly have produced much more efficient vessels, but their number would have been pitifully small. In any event, the board had no choice in the matter; it took the only course left open to it to modernize its fleet.

But all this is beside the point. The modernization of a few old vessels is but a palliative and in no sense a cure. To a small extent it provides for the present, but an established shipping policy and the permanence of our overseas merchant fleet is in no way guaranteed by the substitution of oil engines for steam on a dozen or so war-time ships. What must be had is an established building program, but there is no reason to suppose that there is any more prospect of this now being undertaken by private companies, unaided, than there has been in the past.

In his address, before mentioned, Captain Dollar implies, if he does not say it in so many words, that one of the main obstacles standing in the way of the building up of a large and successful merchant marine by private enterprise is the presence of the government in the industry. He neglects to say that the only reason he or any other operator can run American ships in the overseas trade is that these ships have been furnished by the same governmental agency which he decries—furnished at a price very much less than the cost of building new ships in the cheapest of foreign shipyards, in effect a subsidy and a very liberal one. Captain Dollar says that the present privately owned fleets must expand if they are to live, that they "must take the whole world for their field of operation." How they are to be maintained when the present ships are gone, much less how they are to expand, he does not say. In the past, he has operated foreign ships on his foreign lines, doubtless he will do so again unless the supply by the government of vessels at a ridiculously low price is to continue. The only alternative is financial government aid of some sort and Captain Dollar knows this as well as anybody if not a whole lot better.

That a stable and definite shipping policy on the part of the government is needed to clear the present situation is patent enough but we submit that such a policy will not be forthcoming until the general public becomes sufficiently familiar with the situation to have a really intelligent opinion in regard to it. Captain Dollar's address, excellent so far as it went, stopped short of the essential and basic question which continues to underlie the whole American shipping problem—How shall we get the ships?

German Developments in Marine Engineering

THE remarkable rehabilitation of the German merchant marine which has taken place since the close of the war has been the subject of frequent mention in these pages as well as in those of other marine publications. This phenomenal industrial accomplishment has been carried out at the time when the advantages of the internal combustion engine, particularly in long voyage service, had come to be fully realized and, furthermore the desirability of higher speed and consequent more regular and more exactly scheduled operation was coming to be generally appreciated. In consequence of these influences the new German ships are representative of the most modern ideas, both as regards hull and machinery and, to the highest degree, are "competitive" vessels.

With characteristic energy and foresight the German engineers have not allowed themselves to be satisfied with the adoption of Diesels and increased speed alone and the past few years have witnessed extensive experimentation and development with the aim to improve still further propulsive efficiency and in consequence economy of operation.

These improvements are particularly apparent along two distinct lines; there being on the one hand such devices as the contrapropeller and the Oertz and Flettner rudders and on the other the Föttinger hydraulic coupling and the various combinations of such couplings with high speed Diesels and with reciprocating engines and exhaust turbines, as developed by Dr. Bauer of the Vulcan Works at Hamburg and Dr. Wach of the Tecklenborg organization at Bremerhaven.

The various devices for increasing propeller and steering efficiency are well known and have been described in these columns. In the present issue will be found a resumé of a discussion concerning the increases in efficiency which have been obtained by their use which recently took place at a meeting of the German Institution of Naval Architects.

The German developments in geared drives and the combinations of reciprocating engines and low pressure turbines are not perhaps so well known on this side of the water although the former have received considerable attention and been more or less completely illustrated by the technical press. Dr. Bauer's arrangement of gearing, known as the Vulcan drive, is a combination of small, high-speed Diesel engines with mechanical reduction gearing and Föttinger hydraulic clutches, reversing being effected by the latter so that the engines run constantly in one direction.* So far as we are aware the hydraulic reversing coupling has not yet been tried in marine service in this country, but as the arrangement here described combines a transmission efficiency in the neighborhood of 95 percent with the manifest advantages of a non-reversing motor it evidently has a wide sphere of usefulness, and it will be rather surprising if such an installation does not make its appearance on this side of the Atlantic in the field now largely dominated by the electric drive.

* See MARINE ENGINEERING AND SHIPPING AGE, March, 1924, page 168; August, 1925, page 440, and November, 1925, page 615.

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* See MARINE ENGINEERING AND SHIPPING AGE, March, 1924, page 168; August, 1925, page 440, and November, 1925, page 615.

The combination of an ordinary reciprocating steam engine with a low pressure exhaust turbine, in a single unit, is a relatively new arrangement, having been practically introduced in 1926 by Dr. Wach, of the Techlenborg Company, although a patent, covering a very similar device, had been granted to Dr. Bauer several years ago. It now appears that the two have been combined in what is known as the Bauer-Wach system.

The idea of combining reciprocating engines with low pressure turbines is of course not a new one, having come into prominence nearly 20 years ago at which time a number of large vessels were fitted with triple screws, the outboard shafts being driven by reciprocating engines and the centerline shaft by a direct connected turbine which utilized the exhaust steam of the two outboard reciprocating engines. The most notable examples of this type of drive were to be found on the *Olympic* and her sister ship, the ill-fated *Titanic*. It seems somewhat surprising that the construction of these triple screw, combination ships did not become more general as their performance, at any rate so far as fuel consumption was concerned, was remarkably good. The sister ships *Laurentic* and *Megantic*, which came out in 1909, were fitted, the former with a triple screw reciprocating and turbine plant and the latter with twin screw, quadruple expansion engines. Mr. Willett Bruce, of the White Star Line, has recently called attention to the fact that, based on average performance, the *Laurentic* showed a saving of something over 20 percent as compared with the *Megantic*. Mr. Willett Bruce has further stated that the *Olympic* is now realizing a consumption of 0.855 pound of fuel oil per shaft horsepower, for all purposes; a result which compares favorably with the performance of many modern geared turbine ships. These triple screw vessels were in fact a sort of stepping stone from direct drive to geared turbines, and although a number of very large ships were fitted with direct drive subsequent to 1909 their fuel performance, so far as the writer knows, has not, in any instance, equalled that of the combination vessels.

But to return to Germany, in the Bauer-Wach arrangements a low pressure turbine is combined with and supported on the framing of a triple expansion engine. The turbine shaft is connected to the main shaft through a hydraulic coupling and a double mechanical reduction gearing at the after end of the engine, the hydraulic coupling enabling the turbine to pick up its load without shock and automatically cutting it out when maneuvering, at which times the propeller is actuated by the reciprocating engine alone.

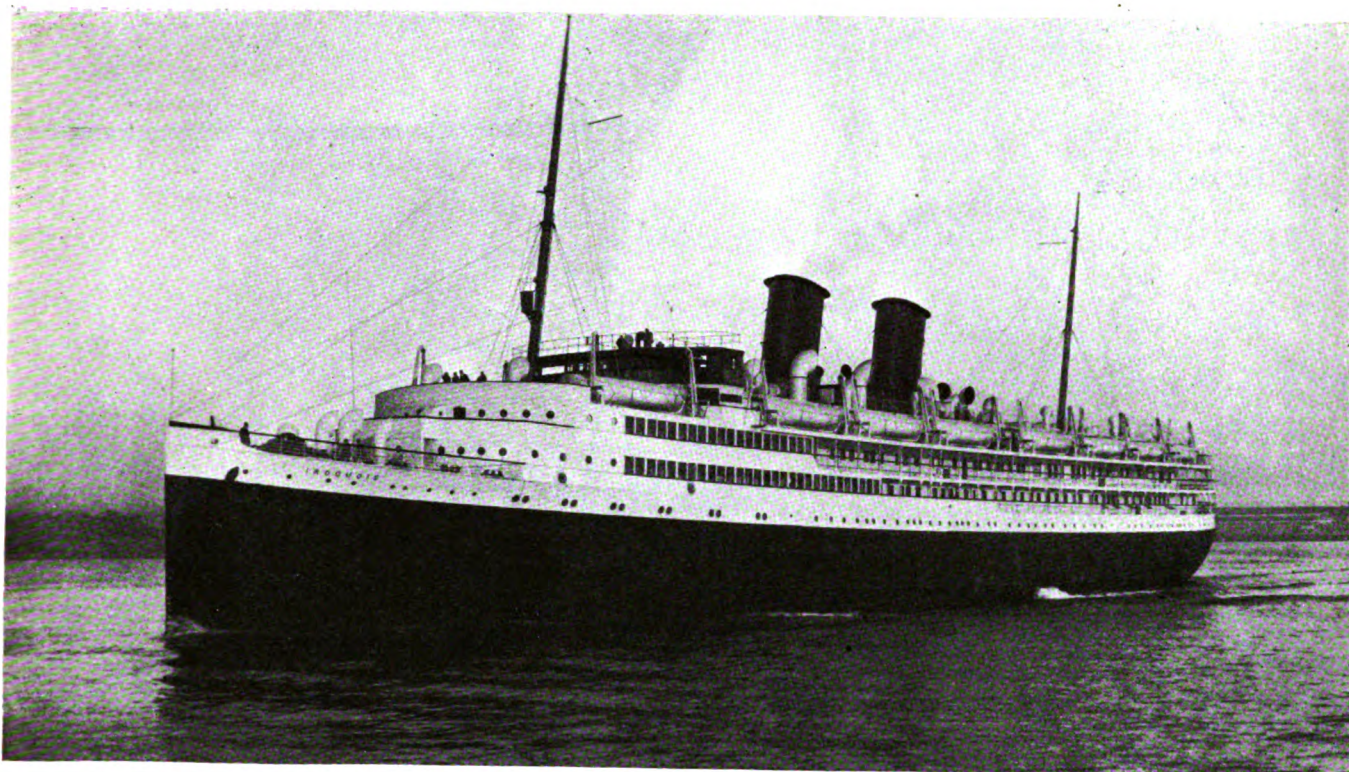
The addition of the low pressure turbine is reported to give a very material increase in power with no increase in fuel consumption, in fact even better than that obtained on the triple screw combination vessels previously mentioned. The Bauer-Wach system would appear to have a wide field of usefulness in the conversion of present reciprocating engine marine plants to the combination form, for while the cost of making such a change might be considerable the saving in fuel effected should more than cover the capital outlay in a comparatively short time. Elsewhere in this issue there will be found a more detailed description of the Bauer-Wach system.

Another interesting German development is the Woolf steam engine which combines a simplified valve arrangement with small clearances and, in the low pressure cylinder, the uniflow principle. This engine is also described elsewhere in this issue.

Leaving systems of propulsion and turning to specific ships, there are a number of vessels now under construction in Germany which call for more than passing mention. The *Cap Arcona* in which a somewhat novel arrangement of geared turbine drive and watertube boilers is combined with a large auxiliary Diesel plant for operating all auxiliary machinery we expect to describe and illustrate fully when the ship goes into commission next fall. There are also two intermediate class motorships of 16½ knots speed which have been ordered by the Hamburg American Line for its transatlantic service. These vessels will have twin screws, each shaft being driven through gearing by two double acting, two cycle M.A.N. engines, the four engines having a collective horsepower of 12,000. Each of these engines will have 6 cylinders 19.7 inches in diameter and 23.6 inches stroke and will operate at 230 revolutions per minute, the corresponding propeller revolutions being 110. This is the first instance where large, double acting two cycle engines have been used in connection with gearing and is an attempt to bring a Diesel installation, as regards weight, size and cost, more in line with the geared steam turbine plant.

Another remarkable innovation concerns the propelling plant of some of the numerous 10,000-ton motor cargo ships for which the Hamburg American Line has placed orders at various yards in Germany. These are all to be single screw craft, equipped in most instances with double-acting, two cycle machinery, but in several of them a new system of airless injection engine will be employed. The engines will have an output of over 5,000 brake horsepower and the design will be that of the M. A. N. but the Hesselman airless injection principle is to be employed, as recently developed by the Allgemeine Elektrizitäts Gesellschaft. Hitherto, although mechanical injection has been utilized with the Doxford and certain other engines, it has never been employed with double acting, two cycle motors and many engineers consider that, with the success of its application to engines of this class, gradually all builders will turn towards airless injection instead of the usual blast air system. The peculiarities of the Hesselman arrangement lie in the special shaping of the combustion chamber, the design of the fuel valve and various other details, which it is claimed, put it in advance of any other method having the same object in view. Moreover, according to the prolonged tests which have been carried out at the A. E. G. it is claimed that a fuel consumption of 0.37 pound per brake horsepower hour is attained, which represents an improvement of something approaching 10 percent on the normal air injection motor—a difference that may be accounted for by the absence of the compressor.

Altogether the Germans are making rapid and substantial progress in the development of marine machinery. If we are to retain such overseas trade as we now have we must at once take a page from their book and proceed with the construction of modern, efficient ships.



New Clyde liner Iroquois built for New York-Miami run

Clyde Liners Iroquois and Shawnee

Passenger steamers for New York-Miami service designed
by Theodore E. Ferris and built at Newport News

COINCIDENT with the beginning of its eighty-third year of steamship operation in the Atlantic coastwise service, the Clyde Steamship Company, New York, has just completed the last two vessels of a \$14,000,000 construction program begun two years ago, comprising six of the largest, fastest and most luxurious passenger and freight steamships in this service, all of which were designed by Theodore E. Ferris, naval architect, 30 Church street, New York, and built by the Newport News Shipbuilding and Dry Dock Company, Newport News, Va. This extensive building program was undertaken by the Clyde Line under the leadership of H. H. Raymond, president of the line from 1913 until January of this year when he was elected chairman of the Board of Directors of the Atlantic, Gulf and West Indies Steamship Lines.

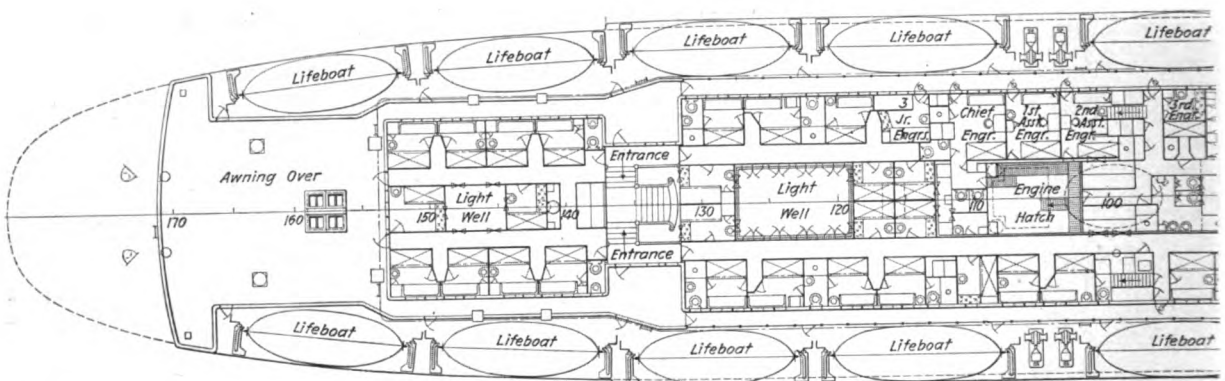
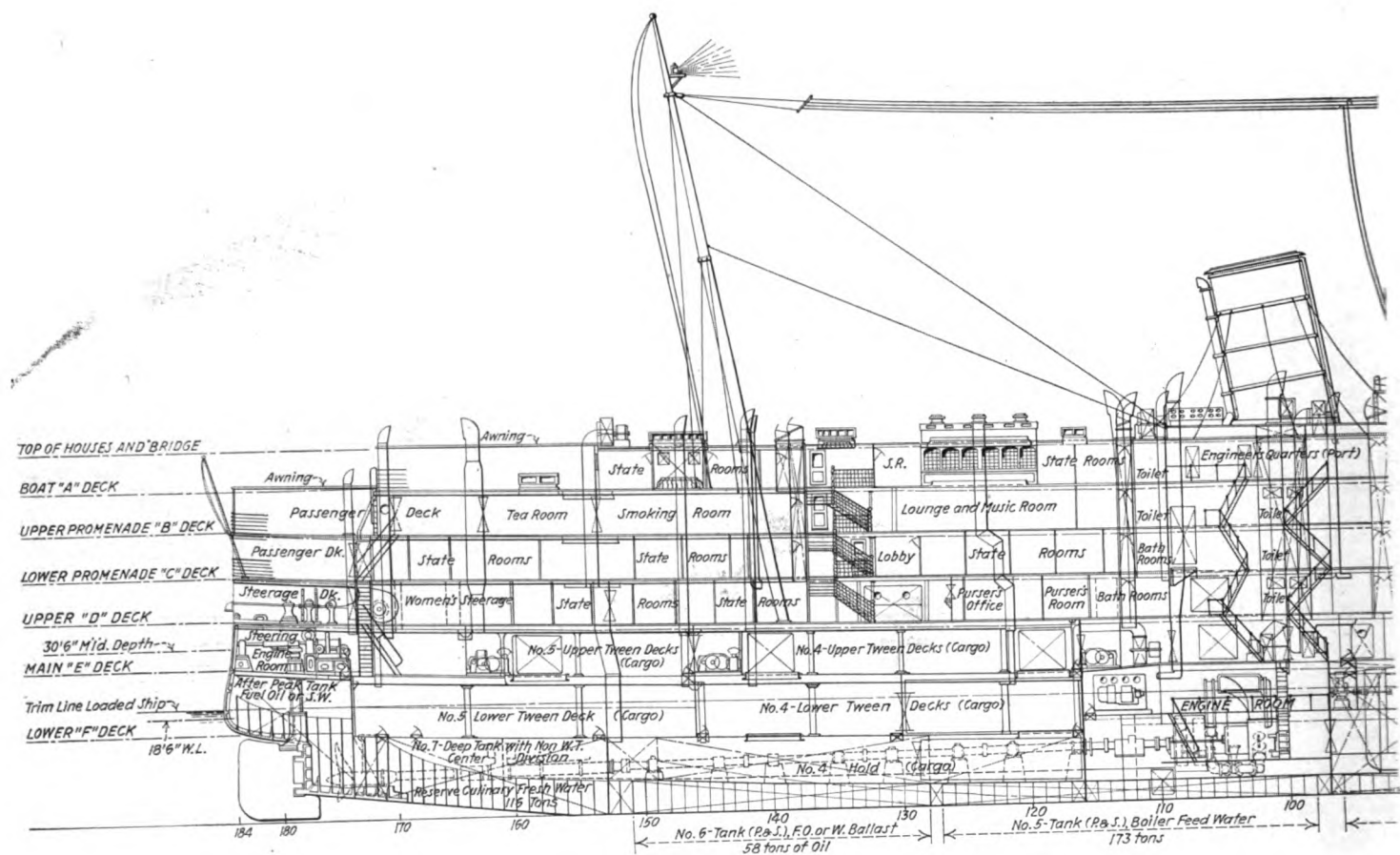
The six new ships included in this program comprise two groups, the first group consisting of four single screw 16-knot vessels, 402 feet long, and the second group consisting of two

twin screw 18-knot vessels over 407 feet long. The vessels of the first group included the *Cherokee*, *Seminole*, *Mohawk* and *Algonquin* which were described in MARINE ENGINEERING AND SHIPPING AGE for June, 1926, page 323, and for August, 1926, page 435. The vessels of the second group, which include the *Iroquois* and *Shawnee* described in this article, were designed especially for express service between New York and Miami.

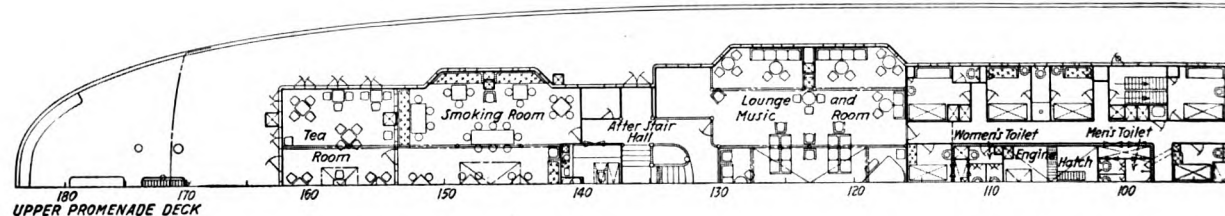
The *Iroquois* and *Shawnee* were built to the highest class of the American Bureau of Shipping. They are not only the largest and fastest ships in the Atlantic coastwise trade but they are fitted out with all the latest improvements for the safety, comfort and enjoyment of ocean travelers. These ships cost approximately \$2,300,000 each, and, although designed for a normal speed at sea of 17½ knots, they are provided with a considerable reserve of power as shown by the fact that the *Iroquois* on her trials developed a speed of 19.8 knots with the engines developing 10,680 shaft



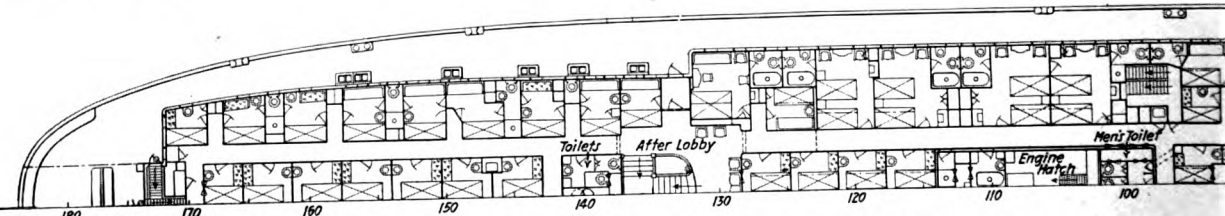
View of the Shawnee, showing her bulbous bow



BOAT DECK



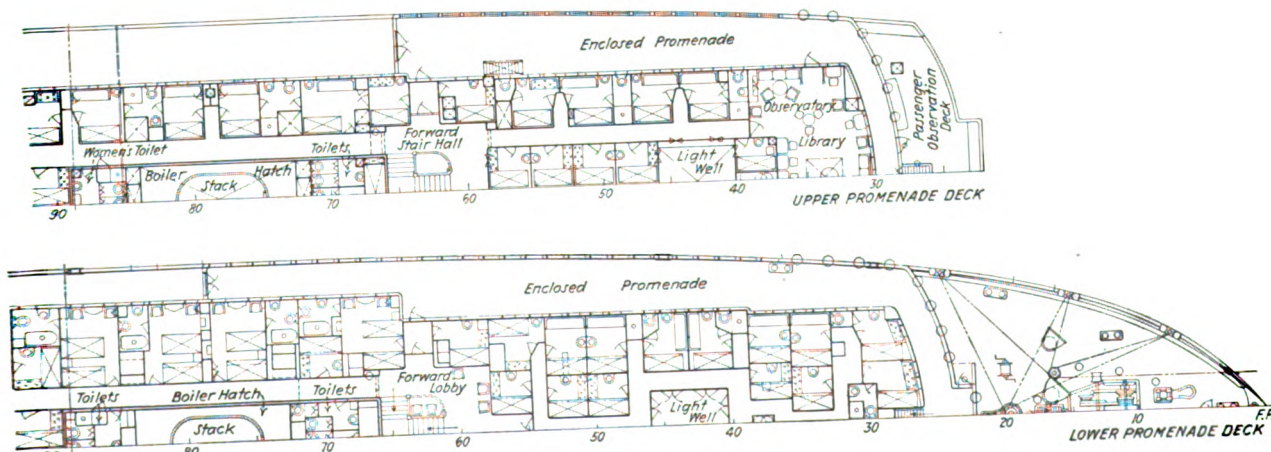
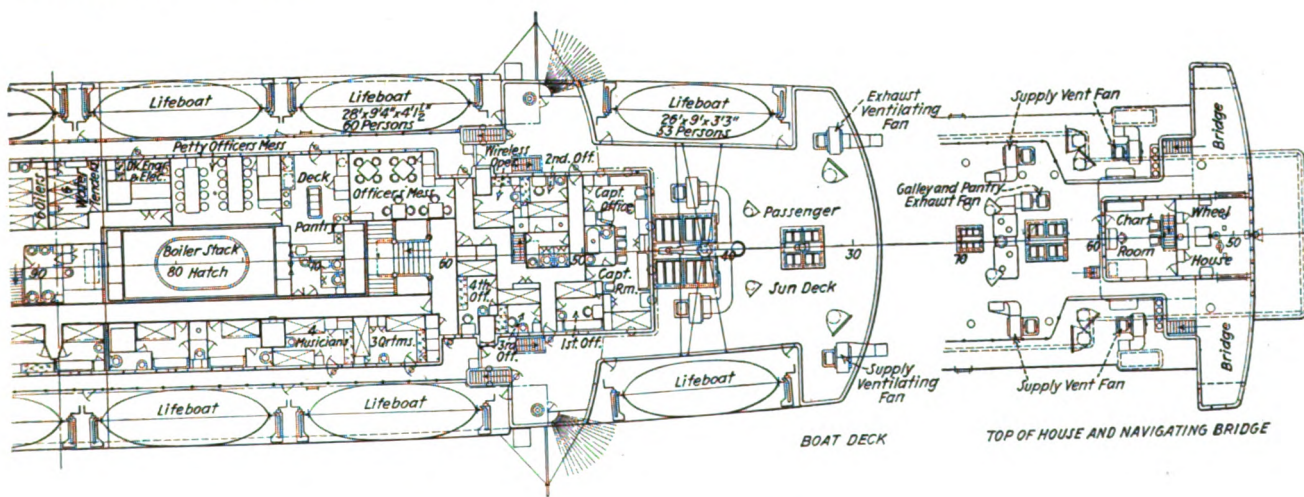
UPPER PROMENADE DECK



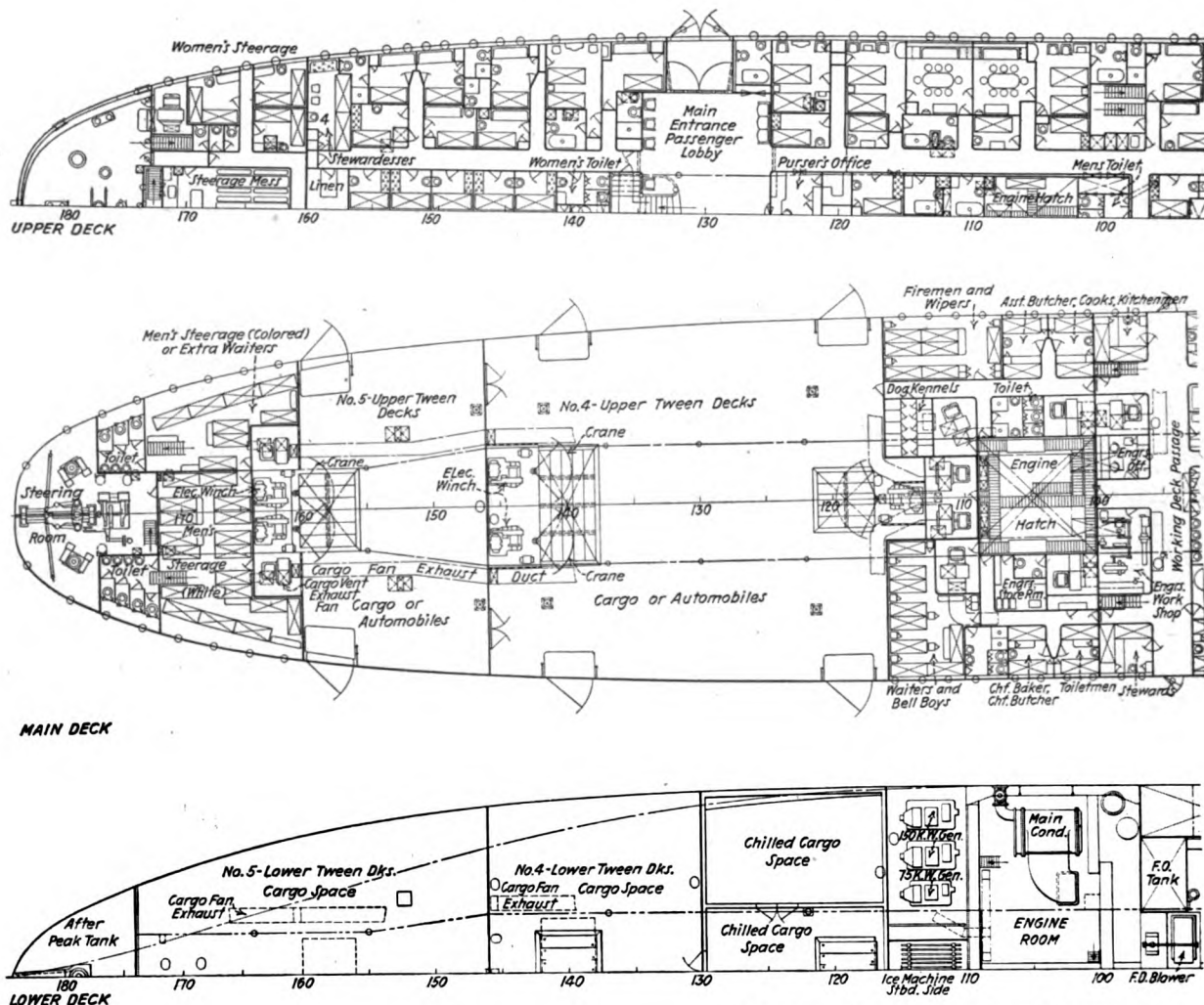
LOWER PROMENADE DECK

Inboard profile and plans of boat, upper promenade and lower

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promenade decks of the Clyde liners Iroquois and Shawnee



Plans of the upper, main and lower decks of

horsepower with the propellers turning at 155 revolutions per minute. It is expected that these vessels will maintain a 44-hour service between New York and Miami, which compares favorably with railroad schedules between these points. During the summer months of this year the *Iroquois* will be used for vacation cruises from New York and Boston to Halifax, Quebec and the Saguenay river. The vessel will leave New York on her first summer cruise on July 9. In the fall both the *Iroquois* and *Shawnee* will be placed on their regular run to Miami.

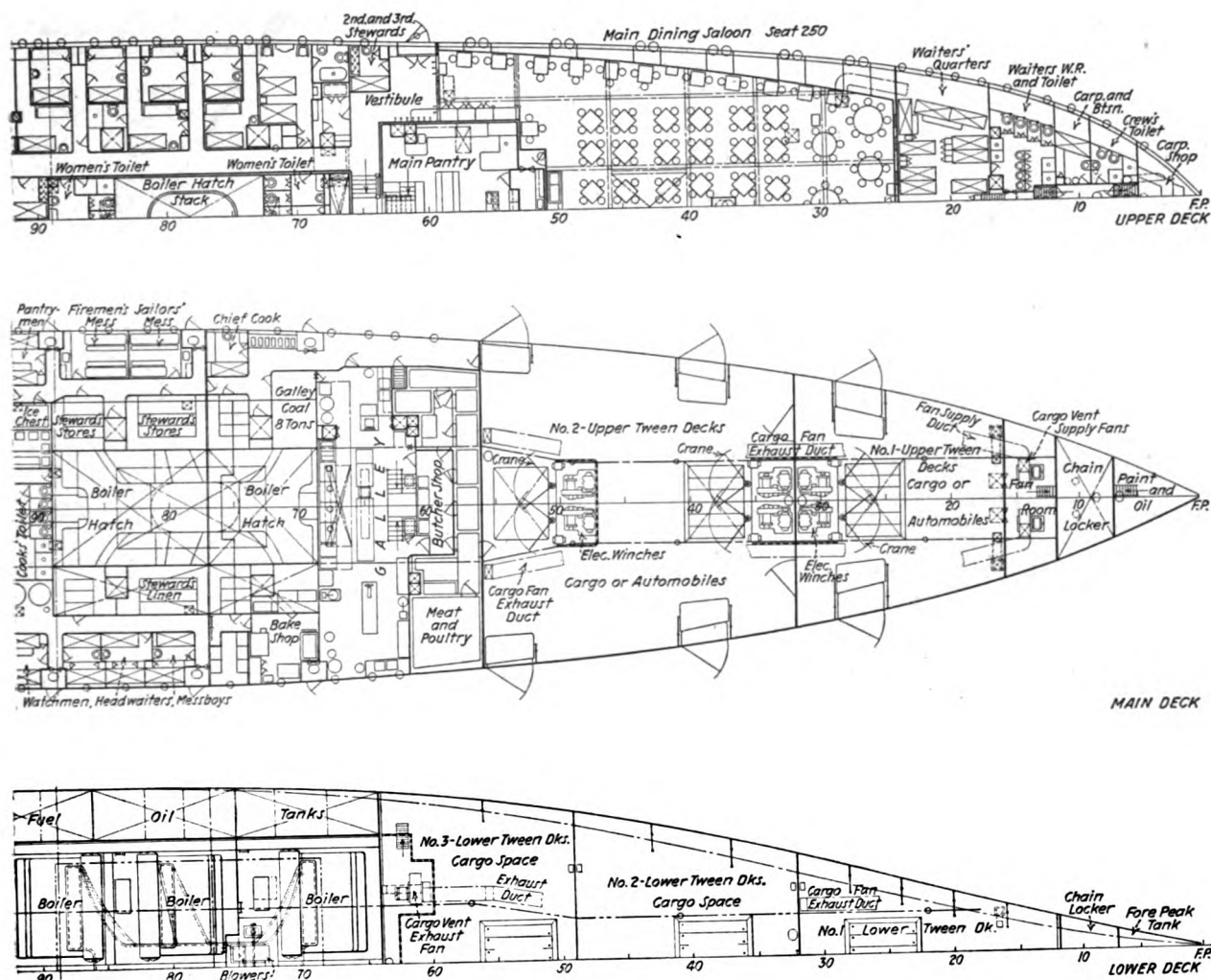
The main particulars of these new express steamers are as follows:

Length overall	407 feet 3 inches
Length between perpendiculars	394 feet 6 inches
Beam, molded	62 feet 0 inches
Depth, molded to upper deck	30 feet 6 inches
Sheer, forward	6 feet 10 inches
Sheer, aft	3 feet 8 inches
Load draft, designed	18 feet 6 inches
Load draft, maximum	20 feet 6 inches
Designed speed	17½ knots
Displacement at 18-foot 6-inch draft	7,560 tons
Deadweight capacity on 18-foot 6-inch draft	1,580 tons
Deadweight capacity on 20-foot 6-inch load draft	2,620 tons
Block coefficient	0.565
Cargo capacity	178,400 cubic feet
Fuel oil capacity	1,203 tons
Fresh water capacity	625 tons
Salt water capacity	691 tons
Passenger capacity, first class	640
Passenger capacity, steerage	114
Crew	166
Gross tonnage	6,500
Net tonnage	3,800

The ships are of the twin screw 3-deck complete superstructure type having a cruiser stern and bulbous bow. Details of the hull construction are shown on the midship section reproduced on pages 380 and 381. The hull is transversely framed, has a continuous double bottom and is subdivided into 10 watertight compartments by 9 transverse watertight bulkheads, 8 of which extend to the upper deck and one to the main deck. There are six decks, two in the superstructure and 4 in the hull, designated from the top down as boat, upper promenade, lower promenade, upper, main and lower. The lower, main and upper decks are fully plated and the lower promenade deck is partially plated. The upper deck at the after end and the lower and upper promenade decks outside of the houses have calked wood decks. The engine and boiler casings as well as the light and vent trunks, stack ventilating trunks and the ventilating fan supply and exhaust trunks are built entirely of steel. There are two pole masts, one smoke stack and a ventilating stack which is a duplicate in appearance of the smokestack.

The bulbous bow, which was adopted to decrease water resistance, is a very unusual feature in merchant ships although it has been used extensively in naval work.

The cargo is handled through six side ports on each side of the vessel between the main and upper decks. From the main deck the cargo is transferred to the holds by means of electric winches and swinging cranes through six blind hatches in the main deck and five in the lower deck. Space is available for about 80 automobiles. In addition to the cargo ports there is also one stowing port off the main deck



the Clyde liners Iroquois and Shawnee

on each side amidships, one exit port off the upper deck on each side aft of the dining room and one main passenger entrance port off the upper deck on each side.

GENERAL ARRANGEMENT

The profile and deck plans reproduced on pages 376, to 379 inclusive show the general arrangement of the ship.

The first class passengers are berthed in staterooms and special suites on the boat, upper and lower promenade and upper decks, private baths being provided with many of the rooms. With the exception of the dining room and main entrance lobby, which are located on the upper deck, the public rooms are located on the upper promenade deck and include an observation room and library forward and a lounge, music room, smoking room and tea room aft. The deck officers are housed forward on the boat deck and the engineers on the port side of the boat deck amidships. At the forward end of the boat deck, above the observation room and library, is a passenger sun deck 30 feet long extending the full width of the ship.

PASSENGER ACCOMMODATIONS

In the arrangement, appointment and decoration of the passenger accommodations every effort has been made to provide for the comfort and convenience of the passengers and to create the atmosphere of quiet luxury so much appreciated by travelers at sea today. This result has been achieved from designs and under the supervision of Mr. Herbert R. Stone, interior decorator, and Mr. Donald G. McKee of Mr. Ferris' organization.

The dining room is paneled in white mahogany and old ivory with the upholstery and window hangings in rose,

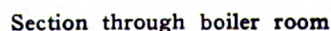
blue and gold. The floor is attractively tiled in sienna and black marbled rubber tiles. The air ports are concealed behind decoratively painted panels of glass of the Renaissance period.

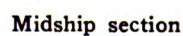
The lobbies at the various stair landings are spacious and have cozy alcoves at the sides with comfortable chairs and sofas grouped invitingly. The walls are paneled in mahogany stained to represent French walnut. At the head of the main stairway and directly under a decorative dome has been placed an oil painting depicting an historic event pertaining to the tribe of Indians for which the ship has been named.

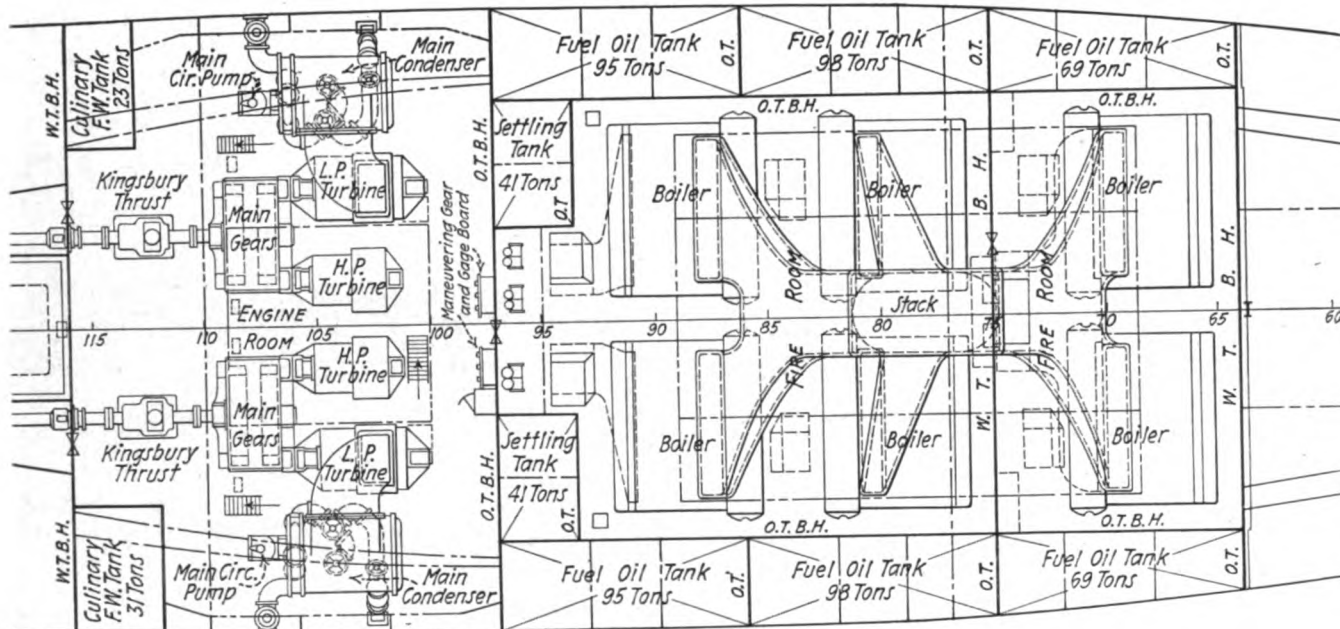
The upper and lower promenade decks provide outside promenades extending for the full length of the deck houses on both sides of the ship and across the forward and after ends, making a complete circuit. Across the forward end and for about half the length down each side the promenade space on both decks is enclosed with Laycock storm windows supplied by the Kearfott Engineering Company, New York.

The social life of the ship centers about the lounge and music room which is luxuriously furnished. The walls are paneled in white mahogany, the window hangings are of old blue and gold and the furniture is upholstered in blue tapestry. Tables for bridge or tea complete the furniture. The floor is of maple covered with oriental rugs which can be taken up for dancing. This room has additional lighting and ventilation through an overhead shaft over which there is a leaded glass dome of artistically wrought Florentine glass.

The smoking room is paneled in oak. The floor is tiled







Plan of engine and boiler rooms

in cork with built-in sofas in the alcoves and lounging chairs around the room upholstered in Spanish leather in blue tones. The window hangings are of blue and gold figured silk damask.

The deck veranda and tea room adjoining the smoking room is decorated in quiet tones of mastic and turquoise with bright linings of rose and green. The furniture is of wicker and reed and the floor is of maple so that it may be used for dancing.

The staterooms are all arranged to open into the public corridors. Many are provided with shower baths and every room has a lavatory with hot and cold running water. The *de luxe* suites are finished in various hard woods and are arranged with private baths and in some cases with adjoining sitting rooms.

In the joiner work Haskelite is used extensively for the passageway and stateroom bulkheads while Vehisote is largely used for ceilings. The floors in the lobbies and passageways and dining room are covered with rubber tile while the staterooms are carpeted. The floors of the entrance lobby and vestibules and of the steerage and crew's quarters are covered with a mastic flooring; the floors in the toilets and baths and barber shop are laid in white vitrified tiling.

The life saving equipment includes one motor and 7 ordinary lifeboats, each 26 feet by 9 feet by 3 feet 3 inches, and 8 lifeboats, each 28 feet by 9 feet by 4 feet 1½ inches; the total lifeboat capacity being 890 persons. The boats are handled by Welin mechanical davits.

DECK MACHINERY

The deck machinery includes an electrically operated American Engineering Company windlass for handling 2¼-inch cable; 11 Lidgerwood-Westingshouse electric cargo winches installed on the main deck; 4 electric winches on the boat deck for handling lifeboats; two American Engineering Company steam capstans on the upper deck aft driven by double engines, 8 inches by 8 inches, from the deck below and one electrically operated capstan on the lower promenade deck forward. The steam steering engine is of the American Engineering Company right and left screw type driven by a 12-inch by 12-inch engine controlled by a telemotor from the wheel house.

In addition to natural ventilation by cowl ventilators, the

ship is equipped with electrically operated fans to ventilate on the supply and exhaust or balanced system the living and operating spaces and the cargo and machinery spaces. The toilet rooms and passageways are ventilated with an exhaust system only, while the pantry and galley are ventilated by a separate exhaust system. The supply fans, of which there are 14 of the Sturtevant type, and the exhaust fans, of which there are 8 of the Sturtevant type, are installed on the boat deck, driven by Diehl motors.

The ventilation of the main and lower 'tween deck cargo spaces, which contain about 135,000 cubic feet, is taken care of by 4 electrically driven Sturtevant supply fans. Two of the fans have a capacity of about 11,000 cubic feet per minute and two a capacity of about 14,000 cubic feet per minute. For the exhaust system for these spaces there are installed 4 exhaust fans, two of about 11,000 cubic feet capacity and two of about 14,000 cubic feet per minute capacity.

The living quarters are heated with steam.

The fire extinguishing equipment includes a Cory fire detecting and alarm system for the passenger quarters, a Rich detecting system in the cargo spaces and a Foamite system in the machinery spaces, together with the usual steam smothering system in the cargo holds.

ELECTRICAL PLANT

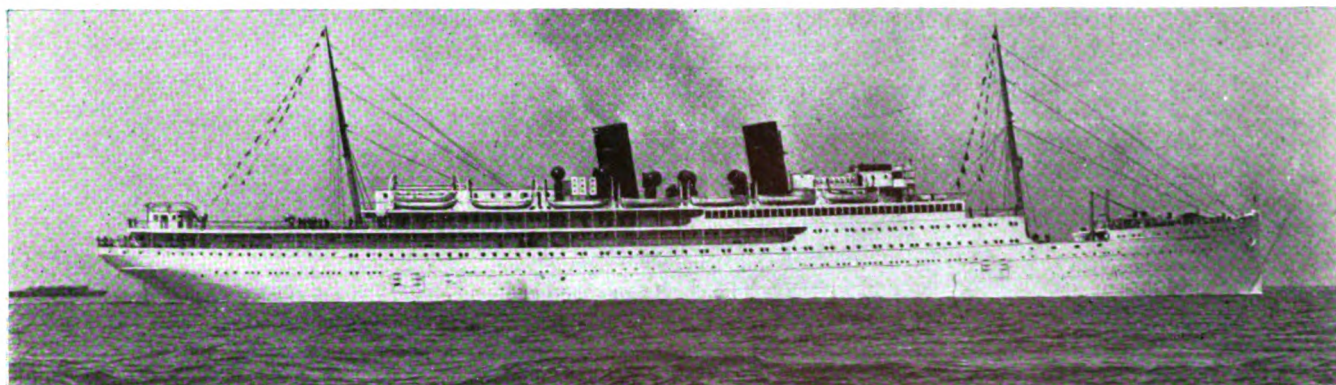
The requirements for electricity for both lighting and power purposes in these vessels necessitated the installation of an unusually large generating plant. This consists of two 150-kilowatt and one 75-kilowatt Westingshouse turbine driven units located on the lower deck flat in the engine room. The total number of lights installed in the ship is equivalent to about 3,000 25-volt lamps. A 10-kilowatt Matthews gasoline driven emergency generator set is installed in the wireless house on the boat deck.

Mechanical refrigeration is supplied for chilled cargo spaces, containing about 15,600 cubic feet, and for the stewards' cold storage boxes, containing about 3,000 cubic feet, by four 8-ton steam driven Brunswick refrigerating machines.

PROPELLING MACHINERY

Propulsion is by two sets of cross compound single reduction geared turbines of the Newport News-Curtis impulse type driving twin screws. The turbines are designed

(Continued on page 411)



S. S. City of Honolulu: Maximum speed on trials, 17.4 knots; average speed, 16.5 knots

The Passenger Steamship City of Honolulu

**Former Atlantic liner rebuilt on Pacific
Coast for Los Angeles-Honolulu service
—Luxurious accommodations provided**

WHEN the Los Angeles Steamship Company, Los Angeles, Cal., found a year ago that the demand for passenger travel between Los Angeles and Honolulu was developing beyond the capacity of its existing fleet, the company purchased the *President Arthur* (ex *Princess Matoika*) in New York and awarded a contract for reconditioning the vessel at a cost of more than \$2,500,000 to the Los Angeles Shipbuilding and Dry Dock Corporation, San Pedro, Cal. The work was carried out in accordance with plans prepared by Pillsbury and Curtis, naval architects, San Francisco, Cal., and under the direct supervision of W. L. Martignoni of this firm.

The vessel was originally built at the Vulcan yard, Stettin, Germany, in 1900. She is a twin screw ship 523 feet 6 inches long, 60 feet 1¼ inches beam and 34 feet 8½ inches depth with a gross tonnage of 10,263. The hull is of copper bearing steel and was found to be in good condition as were her main propelling engines which consist of two 4-cylinder quadruple expansion reciprocating engines with cylinders 27½ inches, 40 inches, 57½ inches and 82¾ inches in diameter by 55 inches stroke. Except for the hull structure and main engines the vessel was stripped and entirely rebuilt into a modern first class passenger liner with exceptionally fine accommodations for 445 first class and 50 third class passengers. The new superstructure has been extended both forward and

aft and four decks are fitted below the boat deck for passenger accommodations.

As stated above, the main engines of the *President Arthur* were retained but they were reconditioned at a cost of about \$100,000, the cylinders being bored and fitted with new pistons and piston rods and the crank shafts reconditioned and all bearings renewed. The original condensers were each fitted with four baffles and four radojets were installed to assist the main condensate pumps.

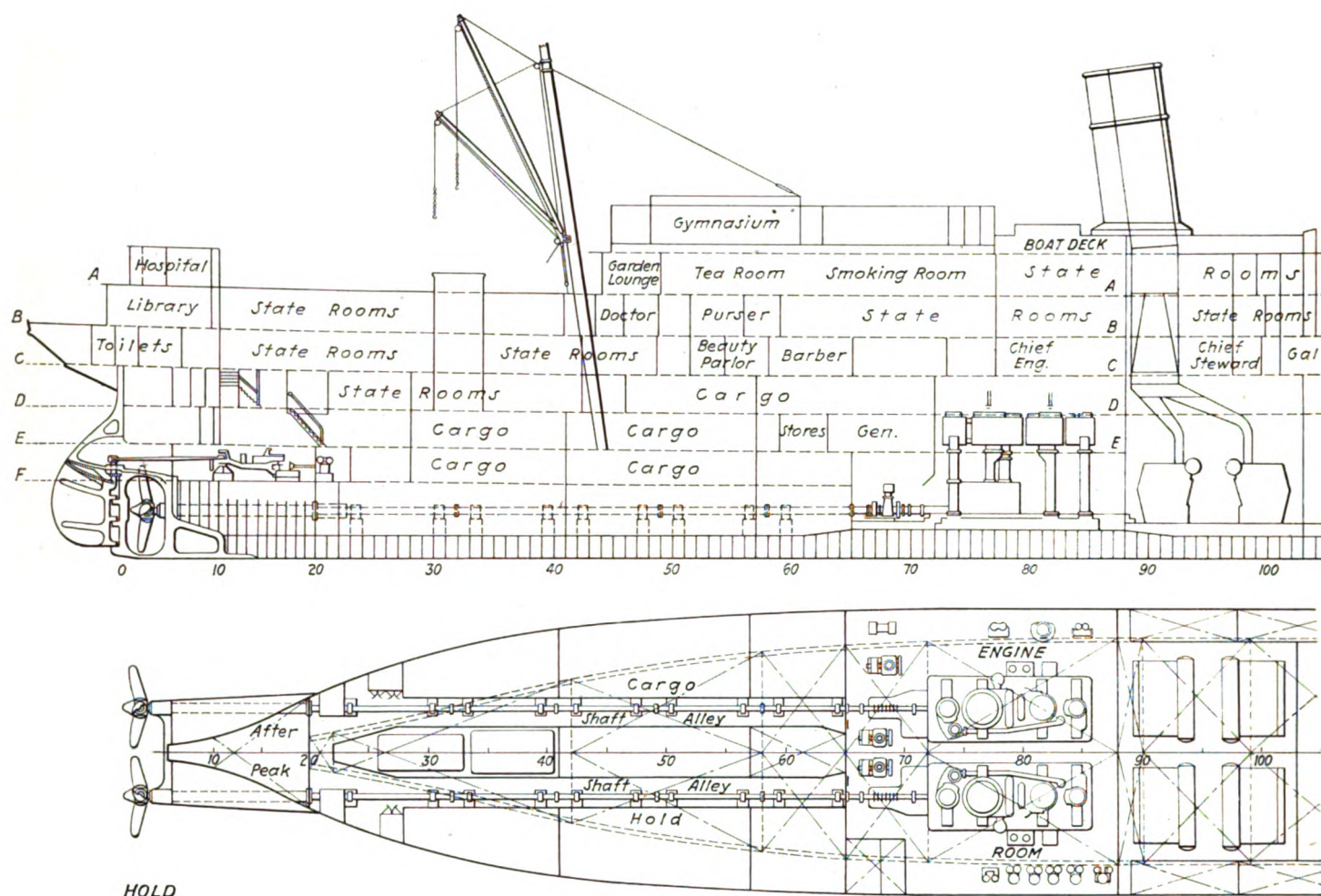
The 6 coal-burning Scotch boilers of the *President Arthur*, 3 of which were single ended and 3 double ended with a total heating surface of 20,000 square feet designed

for a working pressure of 190 pounds per square inch, were removed and replaced with 8 oil-burning Babcock & Wilcox water-tube boilers with a total heating surface of over 35,000 square feet supplying steam at 250 pounds per square inch and working under forced draft. The boilers are equipped with Babcock & Wilcox oil burners and each boiler is provided with a separate motor-driven Sturtevant forced draft blower.

With the greater boiler capacity and higher steam pressure, the main engines of the *City of Honolulu* now develop 10,000 horsepower when running at 82 revolutions per minute as against 9,000 horsepower under former conditions. On her trial trip on May 14 the vessel attained a maximum speed of 17.4 knots and an average speed of 16.5 knots, thus giving an



S. S. City of Honolulu leaving Los Angeles harbor for her trial trip on May 14



Inboard profile and hold plan of the City

ample margin for the actual speed required for maintaining her schedule in service which is slightly under 16 knots.

Fuel oil tanks having a total capacity of 32,000 barrels have been built in the double bottom and in the space formerly occupied by the coal bunkers. Tanks are also provided for carrying 1,000 tons of fresh water.

All of the auxiliary machinery, piping and electrical equipment has been replaced with modern equipment. The

feed, ballast, fire, sanitary, bilge and fresh water pumps are of Worthington make while Quinby pumps driven by Westinghouse motors are installed for handling the fuel oil. As electricity is widely used for driving the auxiliaries and other equipment the new electrical plant is quite extensive consisting of 4 General Electric generating sets, 3 of which are driven by reciprocating engines and one by a steam turbine. Some idea of the size of the plant is shown by the use of over 20 miles of wiring for power purposes, 75 miles

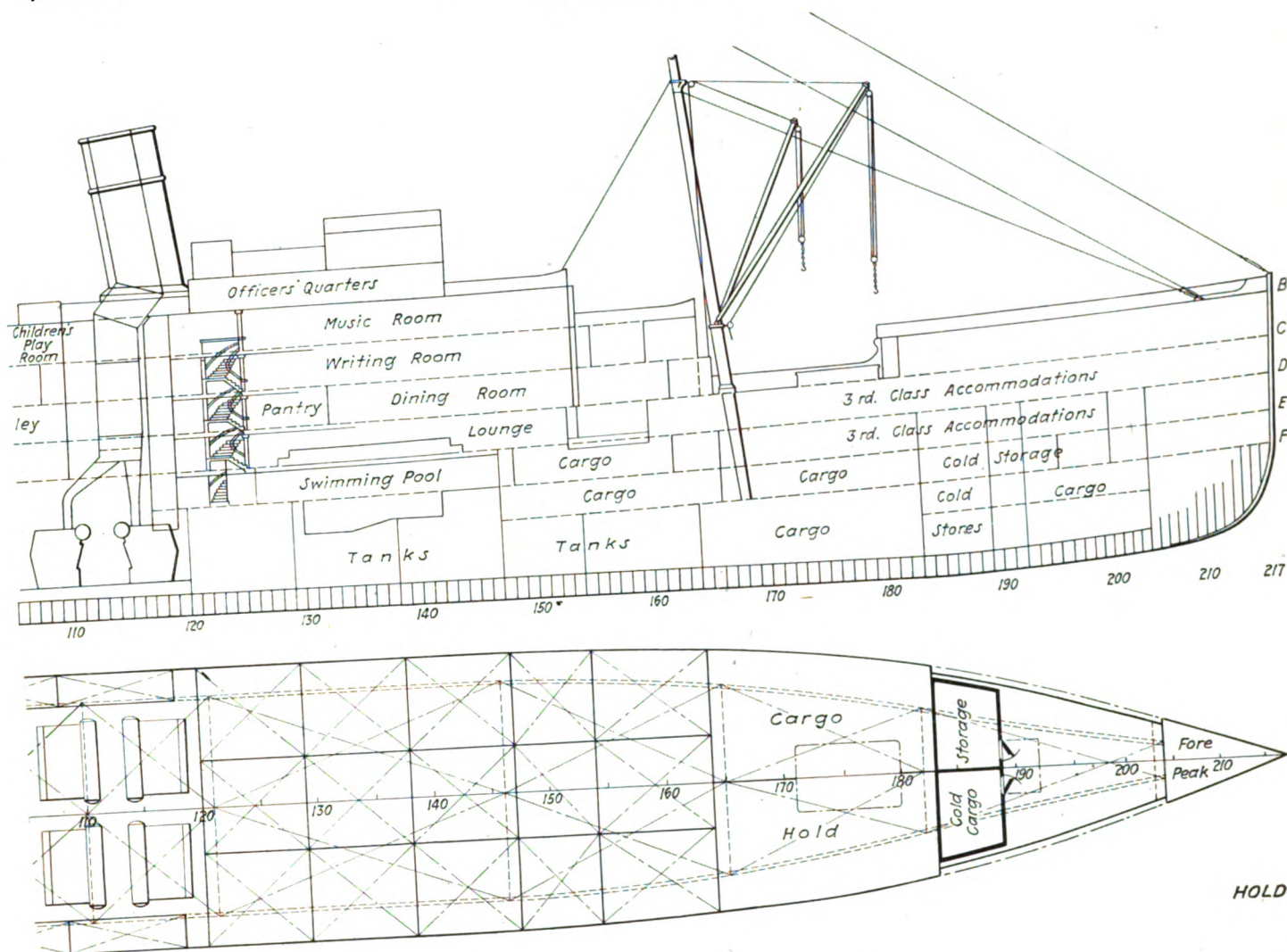


Corner of veranda cafe



Booth in tea room

JULY, 1927

MARINE ENGINEERING
AND SHIPPING AGE

of Honolulu, showing machinery arrangement

of wiring for electric lighting and 25 miles of wiring for telephones.

About 5 miles of steam piping and 11 miles of plumbing piping were installed in the ship.

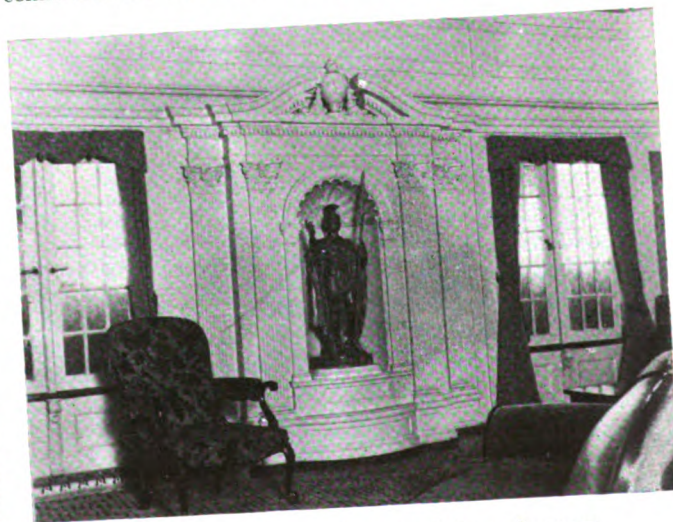
As shown by the photographs and plans, the passenger accommodations are in keeping with the latest hotel and steamship practice. In arrangement and equipment they supply every convenience and comfort known to modern travel and the varied scheme of decoration is designed to

satisfy the most discriminating taste. All of the first class staterooms are equipped with hot and cold running water and most of them have communicating bathrooms. All of the first class staterooms are also equipped with beds instead of berths and in a number Pullman folding berths are added.

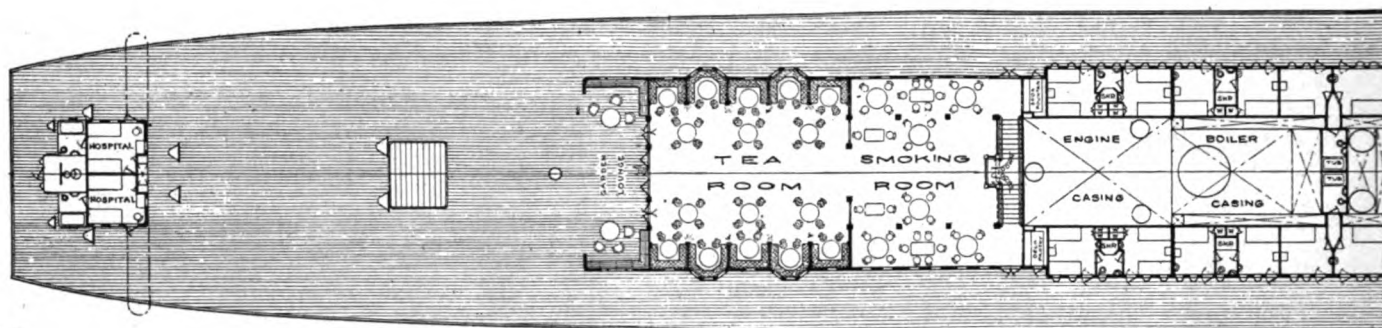
It is believed that the *City of Honolulu* is the first passenger liner on the west coast in which the passenger accommodations have been designed in period architecture.



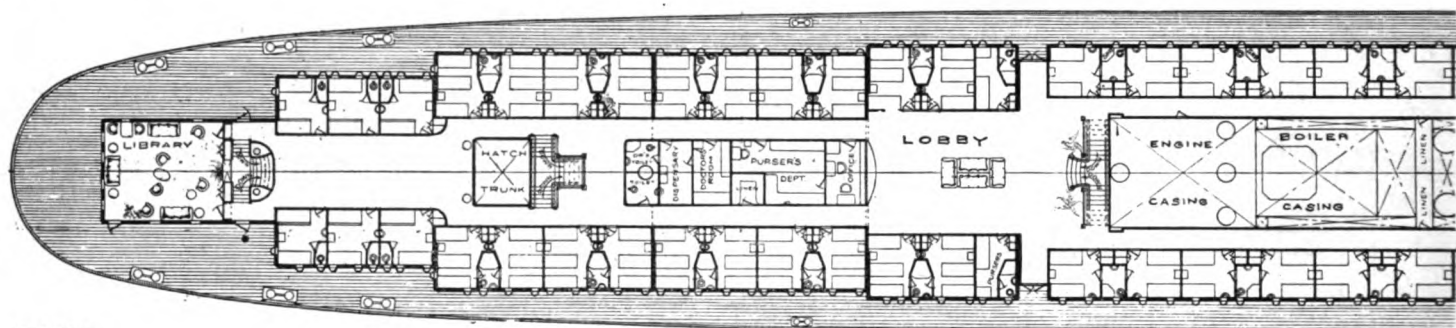
Foyer on A deck



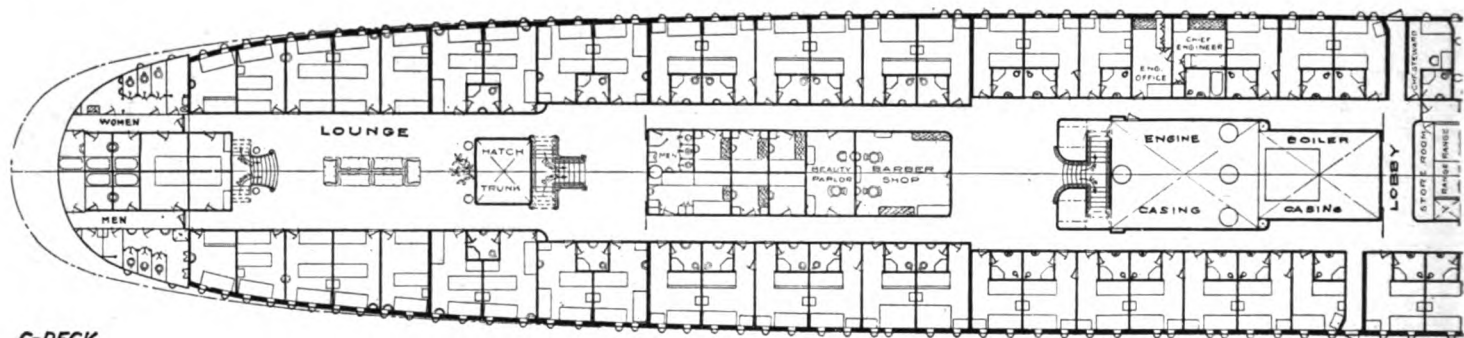
Statue of King Kamehameha I in music room



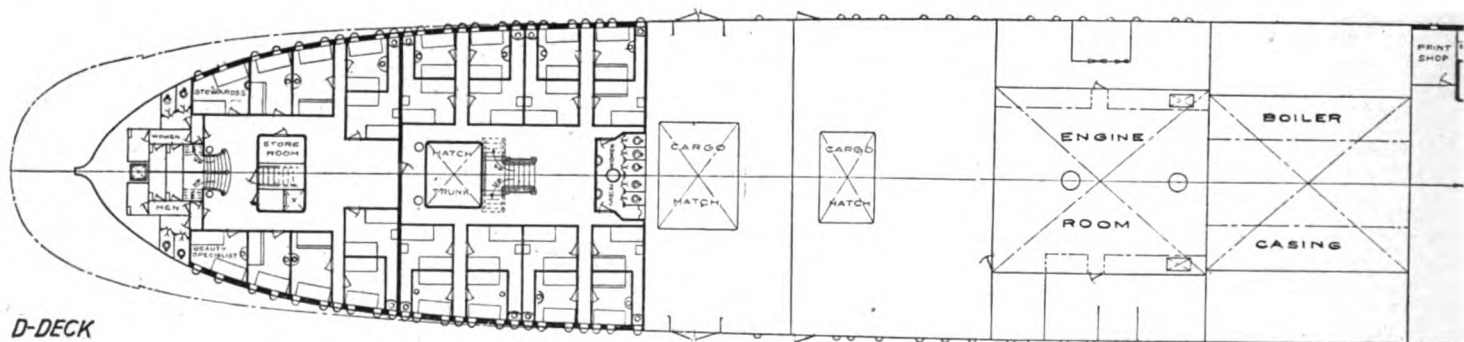
A-DECK



B-DECK



C-DECK



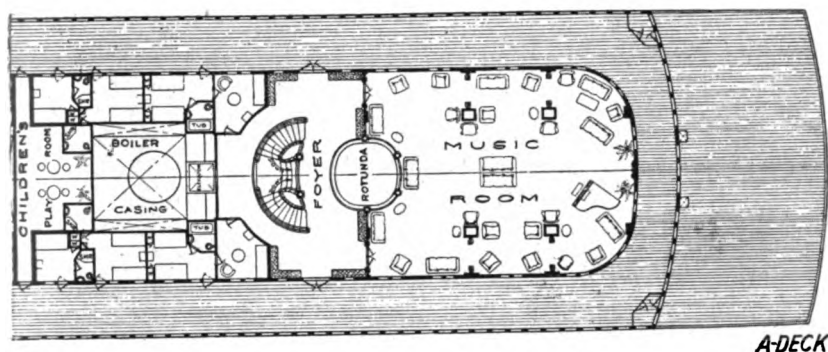
D-DECK

Deck plans of the City of Honolulu showing

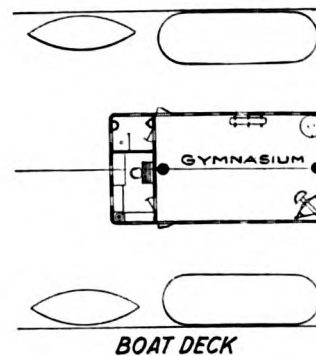
These designs were prepared by C. B. Colyer, naval architect, Los Angeles. The *de luxe* suites are in Louis XVI, Adam and Queen Anne periods. The music room is in French Renaissance, the writing room of Adam design, the smoking room in English Tudor and the dining room of pure Grecian design. The joiner work throughout is entirely new, over 70,000 square feet of Haskelite being used for bulkheads and about 50,000 square feet of Vehisote for stateroom ceilings and panels. The ceilings in the passageways and public rooms are of the sheet rock supplied by the U. S. Gypsum Company.

An unusually large amount of A deck is given over to

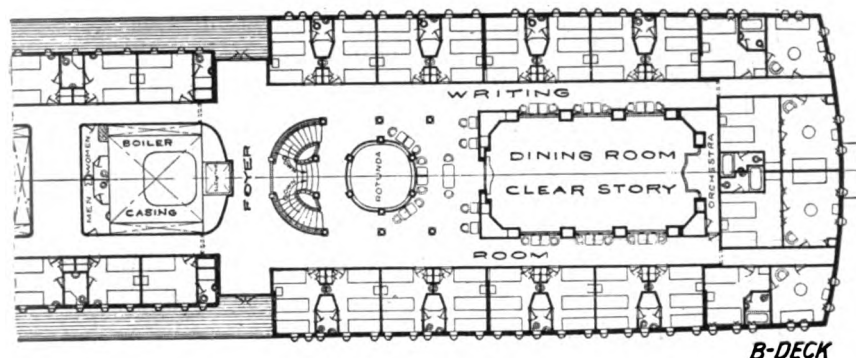
promenade space. The deck is laid with East Indian teak as are all other weather decks on the ship. The forward part of the promenade space for a length of 150 feet is enclosed with plate glass windows operated by mechanism supplied by the Kearfott Engineering Company, New York. Aft of the enclosed promenade is a length of open promenade space for another 150 feet on each side of the deck houses and at the after end of the deck there is 100 feet of open promenade space extending the full width of the deck except for a house at the extreme aft end containing the ship's hospital. Directly forward of the enclosed promenade space there is also an open deck space extending the



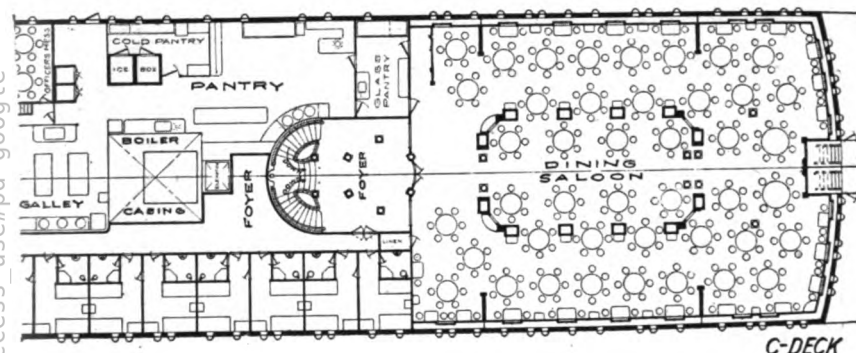
A-DECK



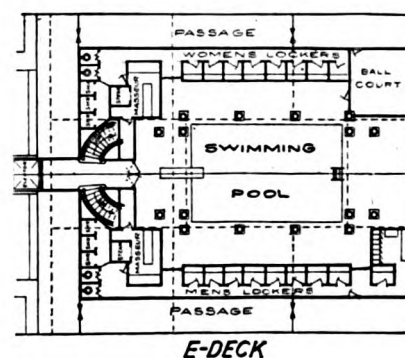
BOAT DECK



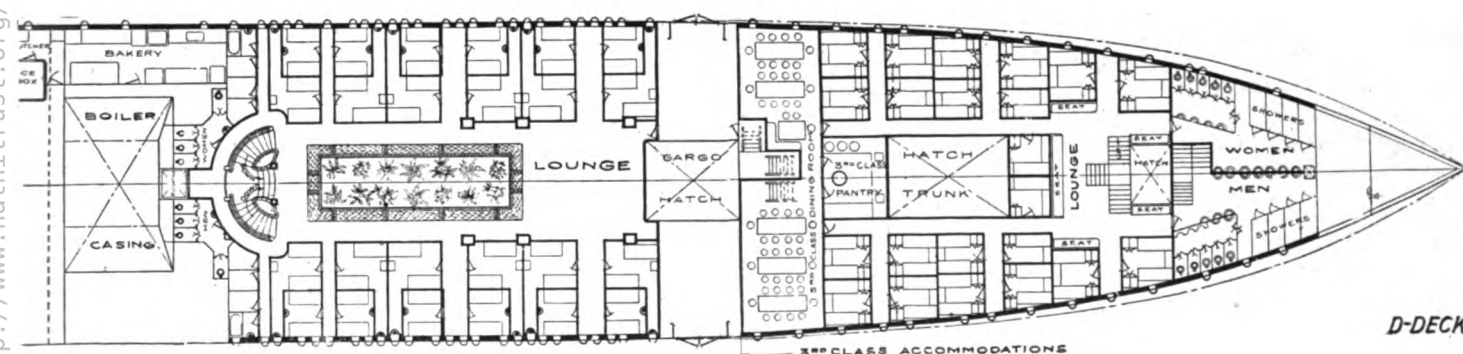
B-DECK



C-DECK



E-DECK



D-DECK

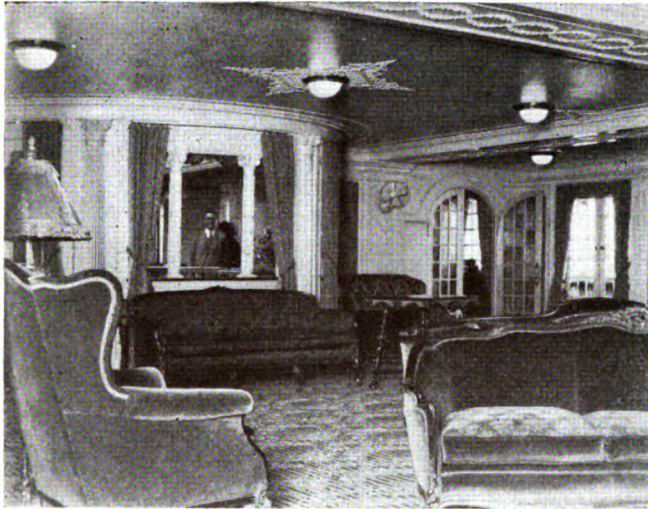
arrangement of passenger accommodations

full width of the ship for a length of 30 feet. Access to this space is through double storm doors from the enclosed promenade space.

The public rooms on A deck include a music room at the forward end, a children's play room amidships and a smoking room, tea room and garden lounge at the after end. The music room, which is 50 feet long and 40 feet wide, is finished in cream and gold blended in very mild green. Facing the entrance doors in a special niche, and finished in antique bronze is a statue of King Kamehameha I. A large leaded glass ceiling light is richly worked out in floral pattern around the base of which runs a frieze in-

corporating ornamental plaques with likenesses of some of the great composers. Decorative wrought iron grills have been introduced in the angles of the ceiling lights to provide for ventilation.

Directly aft of the music room is a foyer from which the main ship's stairway leads down through the passenger decks terminating on E deck at the entrance to the swimming pool. Between the foyer and music room is a rotunda extending down to the entrance of the dining room on C deck. At the after end of the foyer is a passenger elevator serving all the passenger decks. The foyer is decorated in chical gray. On either side of the boiler and engine cas-



Music room, looking aft



Section of music room

ings between the foyer and the smoking room are *de luxe* staterooms with a children's play room amidships. The bulkheads of the smoking room are paneled with white Columbia mahogany in natural finish. The furniture is upholstered in green leather and the windows are draped with green hangings. The tea room is finished in gray.

B deck is given over almost entirely to first class staterooms with the exception of a writing room forward which is finished in French gray and the library at the extreme after end which is paneled in mahogany. Amidships is the main entrance lobby and office.

The dining room which seats over 300 at small tables is at the forward end of C deck, aft of which on the port side are the pantry and galleys. The dining room is over 70 feet long extending clear across the ship and at the forward end is a Grecian fountain. The room is of Grecian design finished in ivory with blue and gold decorations.

The butcher shop and bakery are on D deck directly under the galley with which they are connected by dumb waiters. Three York refrigerating machines are installed for refrigerating the ship's stores and refrigerated cargo, the cold storage spaces having a capacity of over 500 tons.

On E deck directly forward of the main staircase is a large Pompeian swimming pool. The gymnasium is located on the boat deck.

The *City of Honolulu* has a freight capacity of 3,000 tons exclusive of baggage, oil and cold storage. Most of the freight is handled through side ports although there is one cargo hatch forward and a small hatch aft for handling the baggage. There are four side ports which are large enough to handle automobiles.

The passenger quarters are heated with steam. Every stateroom has outside air exposure as well as mechanical ventilation. The original coal ports in the ship's sides have been protected by grill work so that a free passage of air may be available to the lower decks in addition to the regular forced ventilation through the ship. The corridors are generally straight on each deck providing a straight sweep of air and this ventilation is enhanced by cross corridors leading to the grill work closing the

original coal ports. In heavy weather these ports may be closed.

The *City of Honolulu* was delivered to her owners on May 26 and sailed from Los Angeles for Honolulu on her maiden voyage on June 4.

Half-Million Dollar Repair Job Carried Out on Tanker at Gulf Port

REHABILITATED at a cost of approximately half a million dollars in what is said to have been the biggest ship repair job ever undertaken on the Gulf Coast, the tanker *Papoose*, formerly the *Silvanus*, was christened on the Neches river at Beaumont, Texas on May 31, at the plant of the Pennsylvania Shipyards, Inc., where the work was done.

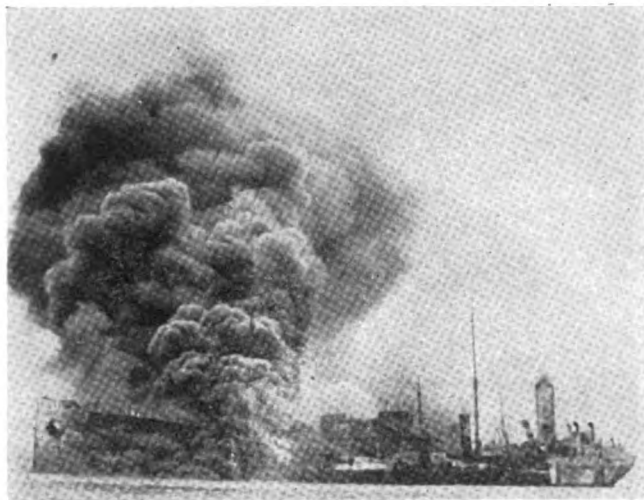
The *Silvanus*, originally the property of the Dutch Shell, collided with the Standard Oil tanker *Thomas H. Wheeler* 40 miles below New Orleans on the night of April 8, 1926. The cargo of benzine carried by the *Silvanus* was ignited from sparks generated by the buckling of her steel plates on the port bow; explosions followed, and fire swept over her decks with the result that 26 members of the crew lost their lives. Although the engines and boilers on the *Silvanus* were uninjured by the fire, the hull was so heavily damaged that many maritime authorities declared the tanker practically a total loss, and she was allowed to pass to the hands of the underwriters.

There were many claims against her, however, and libel actions against the hull and what remained of the cargo of benzine and fuel oil were brought in federal court. After reconstruction bids had been asked for, the hull was finally sold by a U. S. Marshall to the Petroleum Navigation Company, and on October 29, 1926, the vessel was towed up the Neches river to the Pennsylvania Shipyards for repairs.

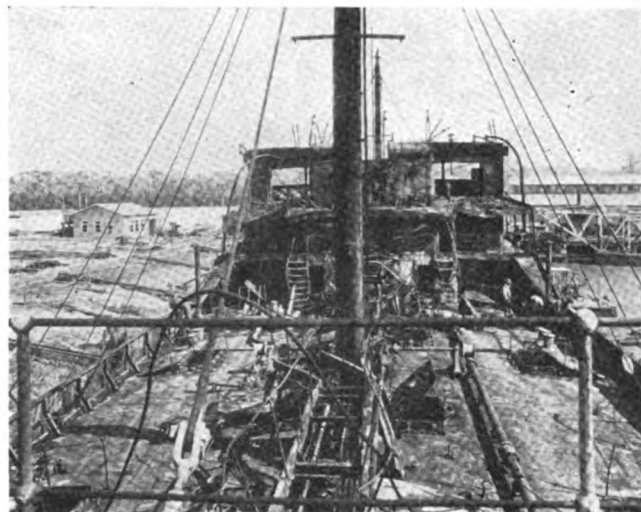
About a month later the work of rebuilding the vessel began in earnest. Three hundred workmen were assigned to the job and stayed at the task continuously for the ensuing six months. The steel plates on the port



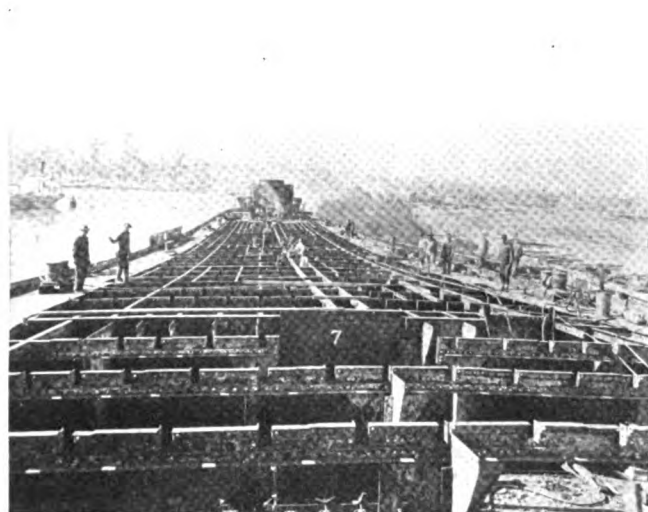
Fountain in dining room



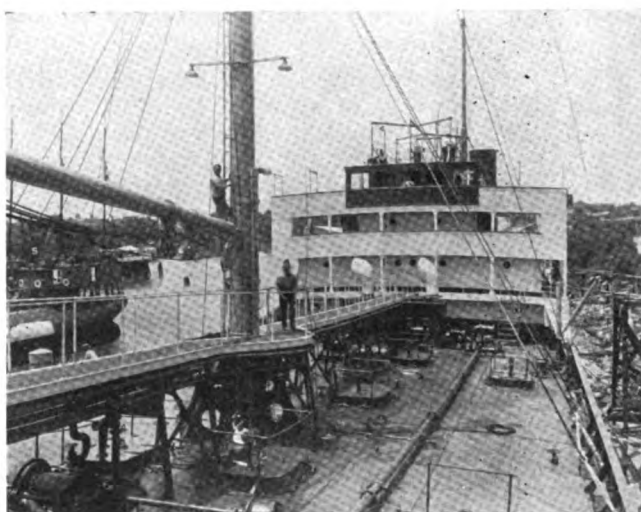
The Silvanus on fire after collision



Result of the explosions and fire



Rebuilding the damaged hull



Deck view of reconditioned ship

side forward had to be replaced. It was necessary to rebuild practically the entire superstructure and to put in new decking and new deck beams. New quarters for the officers and crew were built and elaborately fitted out. The engine room and its equipment were thoroughly overhauled. The *Papoose* is 427 feet long overall, 412 feet long between perpendiculars, 53 feet 1 inch molded beam and 24 feet

7 inches load draft. The capacity of the main tanks is 7,478 tons, or 60,000 barrels, and of the wing tanks, 874 tons, or 7,000 barrels. With her main engine developing 3,000 horsepower she has a speed of 11 knots.

Propulsion is by a 3-cylinder triple expansion engine supplied with steam by 3 oil-fired Scotch boilers. The piston speed is 560 feet per minute. The propellers are 17 feet 9 inches in diameter. Current for the ship's lighting is supplied by two steam-driven generators of 13.75 and 6 kilowatts, respectively.

Following the christening ceremonies at Beaumont, the *Papoose* ran a trial trip to Galveston and then returned to Beaumont, where she took on a cargo of 67,000 barrels of gasoline and sailed to New York.



Ready for business again as the Papoose

JOINT SUMMER MEETING.—The Institution of Engineers and Shipbuilders in Scotland held a joint meeting with the North East Coast Institution of Engineers and Shipbuilders in Glasgow, June 21 and 22. The following papers were read: Historical References to the Progress in the Use of High Pressure Steam, by James Mollison; The Trade Value of Simplification and Standardization in the Details of Ships and Their Machinery, by Charles le Maistre; Observations on Some Economic Factors in Modern Shipbuilding, by John McGovern, and Motor Yachts and Motor Yachting on the Clyde, by F. L. MacLaren.



Twin screw motor ferry Korsor

The New Danish Motor Ferry Korsor

The world's largest combined passenger, car and automobile ferry boat is propelled by Diesel engines

THE ferry service operated by the Royal Danish State Railways Department across the Great Belt between Zealand and Fyen, Denmark, was established in 1883. The first vessels built for this service were paddle steamers having double tracks with a total length of track of 400 feet. These were followed by double tracked screw steamers each having a total length of track of 470 feet. In the latest addition to the fleet, by the adoption of Diesel propulsion, space on the main deck is secured for three tracks having a total length of 788 feet, or nearly 70 per cent more than was available on the double track steamers, although the new vessel is of practically the same dimensions as the older boats because of the necessity of retaining the old jetties. As each of the ferries makes from 10 to 12 trips daily, each of about 1½ hours' duration, this means that the vessel is at sea for about 18 hours in a continuous 24-hour service.

The principal dimensions of the *Korsor*, as the new motor ferry is named, are:

Length	315 feet
Beam, over fenders	58 feet 1 inch
Depth	20 feet 2 inches
Draft	13 feet 1 inch

The vessel carries a certificate for a wagon load of 500 tons and 1,500 passengers; the speed is 15½ knots.

The hull of the *Korsor* was built by the Elsinore Shipbuilding and Engineering Company, Elsinore, Denmark, to the rules of the Bureau Veritas. The propelling machinery was supplied by Burmeister and Wain, Ltd., Copenhagen, Denmark. The hull is built of steel with a flush main deck, carrying the three tracks which are recessed into a wooden deck, owing to the ship also being destined to transport automobiles besides railway cars and passengers. Spacious accommodation is contained on the lower deck fore and aft of the engine room. Above the main deck is a promenade deck nearly 200 feet long covering the full breadth of the vessel.

The hull is subdivided by watertight bulkheads so that it will float with any two adjacent compartments flooded.

ACCOMMODATIONS

Accommodations for first, second and third class passengers are arranged on the promenade deck, the forward part of which affords a perfect shelter, being totally enclosed and fitted with large square windows. The sides and seats are neatly finished in light elm.

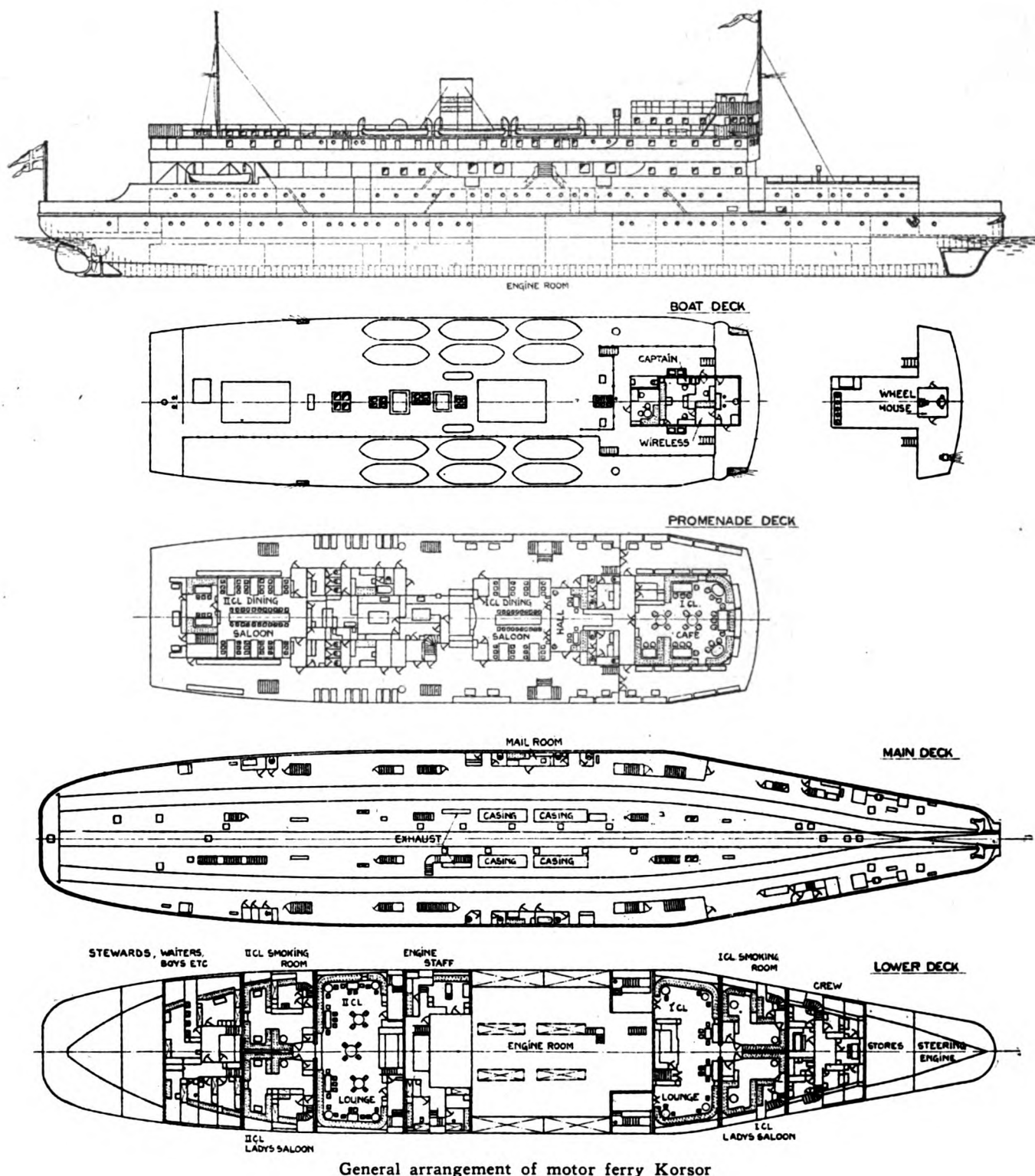
The first class smoking room and restaurant, finished in dark polished mahogany, is located forward on the promenade deck. Through an entrance fitted with baggage racks and a hall finished in stained dark mahogany, having



Automatic gangway partially raised



Automatic gangway lowered



General arrangement of motor ferry Korsor

swing doors with bevelled plate glass, access is gained to the first class dining room, which is panelled in light polished birch, inlaid with black. Aft of the dining room is the galley and at the after end of the promenade deck is the third class restaurant which is connected with a lounge. Immediately aft of the houses there is a veranda.

Above the promenade deck is a lightly constructed boat deck with a navigating bridge at either end, a pilot house and accommodations for officers and the wireless station.

Under the main deck forward and aft of the engine room are spacious saloons for first, second and third class passengers, including a social hall with buffet, panelled in polished birch and stained elm respectively. The buffets are

connected with the restaurants on the promenade deck by means of hoists.

Between the main and promenade decks at the side of the vessel there is a wing deck. The ventilation is carried out with electrically driven centrifugal fans throughout.

Two doors of steel plating are fitted on either side on the main deck hinged to lower by means of electric winches or hand power, acting as gangways for the passengers.

The officers' and crew's quarters are located partly on the promenade deck, partly under the main deck amidships and also fore and aft.

The vessel is fitted with 4 trimming tanks having a total capacity of 400 tons and 4 wing tanks holding 160 tons.

These tanks are arranged in such a way that the water can quickly be transferred from one to another by means of a large electrically driven vertical centrifugal pump, thereby assisting the shunting of the cars to a great extent. In addition there are 2 deep tanks for oil fuel, a double bottom tank for lubricating oil, as well as the necessary tanks and pumps for fresh water.

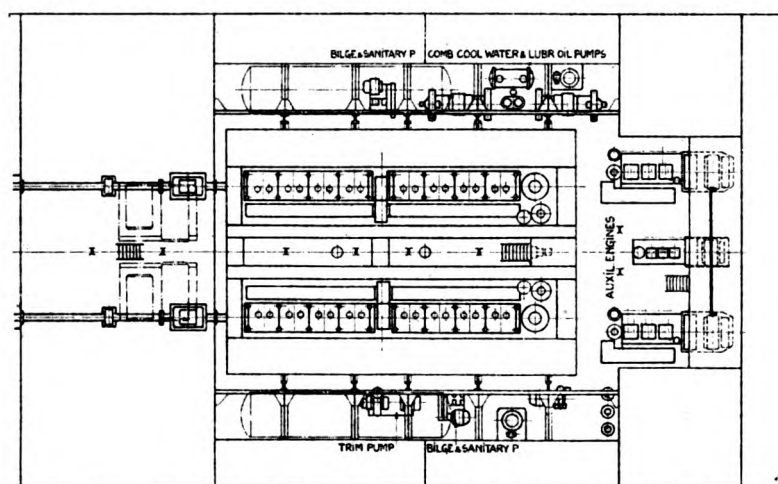
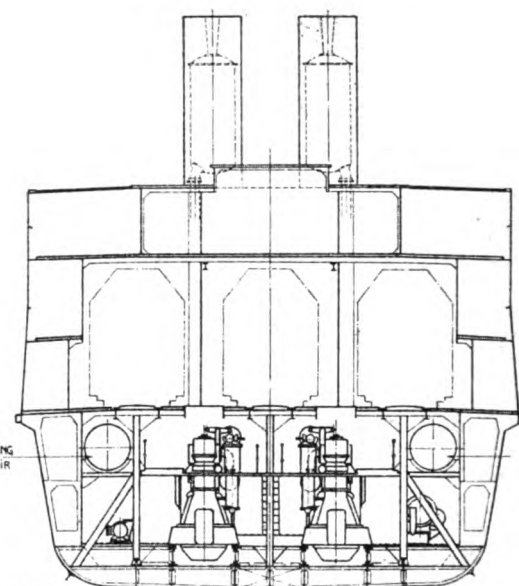
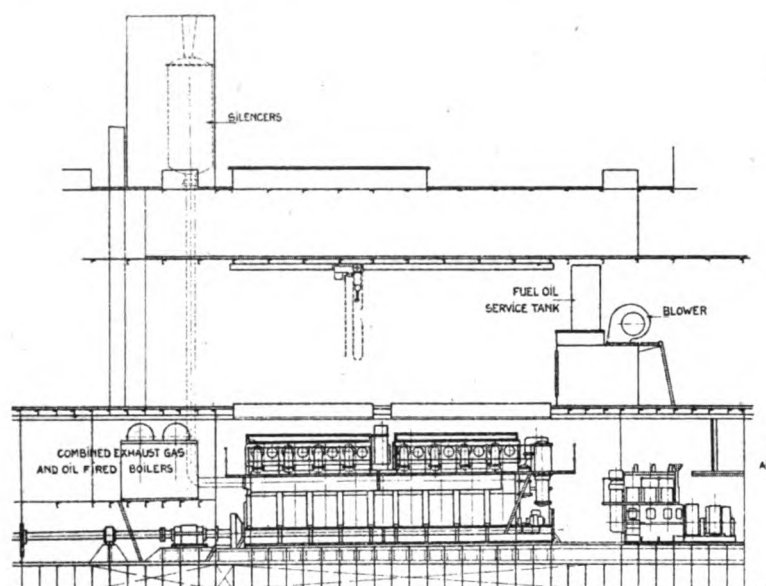
DECK MACHINERY

All the deck machinery is electrically driven, consisting of 2 windlasses with anchors and $1\frac{7}{8}$ -inch chain cables, 4 warping winches for a load of 5 tons, 4 gangway winches

on the fore and aft ends, and bolted together in groups of four and four. The staybolts are passed up through the jointing surface between two and two covers in such a way that the covers are secured direct to the columns and bed plate by means of the staybolts themselves.

The cylinders are fitted with separate cooling water jackets provided with a flange at the top, tightly jointed to the corresponding flange on the underside of the cylinder cover and made tight by a rubber ring at the bottom. The jackets have doors for cleaning and inspection of the cooling water space.

The valves are actuated by cast steel levers, fitted to



Machinery
arrangement
of twin screw
motor ferry Korsor

for a load of 1 ton and 2 steering engines, one forward and one aft. The winches as well as the steering gear are made by Thomas B. Thrige, Odense, Denmark.

PROPELLING MACHINERY

The propelling machinery consists of two 8 cylinder, four cycle, single acting, forced lubricated, direct reversible, trunk piston Diesel engines of the special ferry type constructed by Burmeister and Wain. They are capable of developing 4,000 indicated horsepower when running at 180 revolutions per minute. The engines are fitted with governors of the Burmeister and Wain type, and are able to run evenly at 45 revolutions per minute.

The cylinder covers are of a very strong design, machined

shafts and supported by columns fitted on the cylinder covers. By turning the cam shaft the valve levers are lifted or lowered while the shaft simultaneously is moved longitudinally for ahead or astern position respectively. The cam shaft is driven from the crank shaft by tooth gear wheels and a chain drive of the Burmeister and Wain type.

The reversing gear is worked by means of compressed air in connection with a rotating gear wheel motor, having oil brake. The air is taken from the starting air tanks and the gear is also provided with hand motion.

For forced lubrication a main supply pipe is secured to the bed plate, having branches leading to each main bearing. The crank shaft is drilled at each main bearing so that the oil from the supply main will lubricate the crank

pin and pass to the crosshead through the hole bored in the connecting rods. The bearings for the gear wheels for the cam shaft are lubricated from separate pipes taken from the branches to the main bearings.

Each main engine is fitted with an air compressor of the three-stage type, bolted to the forward end and worked direct from a crank. The capacity of the compressors is ample for the supply of blast air, even at slow speed.

DIESEL GENERATING UNITS

The auxiliary Diesel driven units are arranged athwartships at the forward end of the main engines. They comprise two 3-cylinder 150 brake horsepower Burmeister and Wain engines running at 400 revolutions per minute, each driving a 100-kilowatt dynamo, and one 3-cylinder 75 brake horsepower engine of the Burmeister and Wain type running at 500 revolutions per minute direct coupled to a dynamo with a capacity of 50 kilowatts. They are each direct coupled to a compressor of the three-stage type, designed in accordance with the Burmeister & Wain patented system, allowing the output to be adjusted, either to a small supply sufficient to run the auxiliary engines as Diesel generators, or to a larger, the compressors then acting as reserve to the main engine compressors or maneuvering compressors.

PUMPING PLANT

The pumps are arranged at the back platform of the main engines alongside the wing tanks. Two duplicate plants are fitted for dealing with the cooling water and lubricating oil, each comprising an electric motor, driving on the one side an 80-ton centrifugal pump for the water supply, and on the other side a 60-ton gear wheel pump for lubrication. Two electric driven pumps of the gear wheel type handle the fuel oil, while two sets of electric driven twin-plunger pumps take care of the bilge and sanitary service.

HEATING AND AUXILIARY BOILERS

Two duplicate sets of combined boilers, designed for a working pressure of 100 pounds per square inch are fitted in a separate boiler room abaft the engine room. They are arranged for oil-firing as well as the utilization of the exhaust gases from the main engines for heating the accommodations of the ship and the cars on board during the cold seasons. The boilers are of the watertube type fitted with an upper and lower drum connected by vertical tubes.

Before the exhaust gases are admitted, the boilers are thoroughly heated by means of oil firing. The oil-firing is also intended to assist the exhaust gases during exceptionally cold periods.

The exhaust gases and the products of combustion of the oil burners are completely separated in these combined boilers, to prevent an eventual explosion, by changing over from exhaust gas to oil-firing. The two boilers are connected by three pipes for steam, hot and cold water respectively, thus a lively circulation is obtained during the raising of steam.

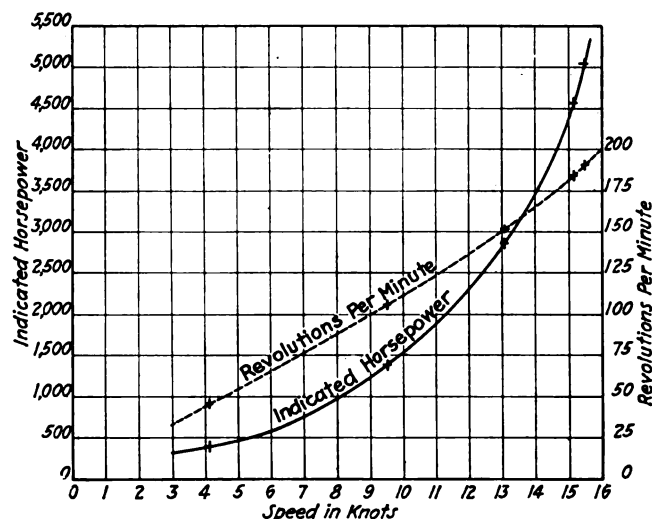
An evaporation of 1,300 pounds of steam was obtained on the trials in each exhaust boiler, while the temperature of the gases were reduced about 250 degrees C. in the boiler. The steam produced proved ample for the requirements.

The exhaust boiler acted at the same time as a silencer and the absence of noise was noticeable.

THE TRIAL TRIP

On May 7, a speed trial was held in the Sound. At the maximum speed of 15.51 knots, the main engines developed about 5,100 indicated horsepower at 191 revolutions per minute. After the trial the ferry returned to the yard at Elsinore to complete its accommodation.

On May 13, the *Korsor* left Elsinore for Korsor to be put into service. On the way to Korsor a consumption trial divided into two sections was held. The first part lasted four hours with the main engines developing 3,620 indicated horsepower. The consumption per indicated horsepower-hour of fuel oil was 141.5 grammes. The last part



Speed-power curves from trial trip of M. S. Korsor on May 7

of the trial lasted two hours with the main engines developing 4,160 indicated horsepower with a fuel consumption of 142.1 grammes per indicated horsepower-hour.

When maneuvering in and out of the jetties, the splendid maneuvering ability of the motors was demonstrated.

The Motor Tanker Tydol

THE Tide Water Oil Company, New York, has recently placed in commission an interesting motor driven tank barge for canal and coast service. This vessel, the *Tydol*, was designed by the oil company and built at Chester, Pa., by the Sun Shipbuilding and Dry Dock Company, being Hull No. 103 on the latter's yard list.

The new vessel has the following dimensions and general particulars:

Length overall	260 feet 10 1/4 inches
Length at 12 foot waterline	258 feet 8 inches
Length between perpendiculars	252 feet 0 inches
Beam, molded	40 feet 0 inches
Beam, over fenders	41 feet 5 inches
Depth, molded	14 feet 0 inches
Draft, deep load, molded	12 feet 0 inches
Corresponding displacement (salt water)	2,778 tons
Block coefficient (12 foot waterline length)	0.775
Midship section coefficient	0.974
Draft, canal, extreme	9 feet 0 inches

The total deadweight capacity is 1,908 tons at 12 feet molded draft in salt water.

The barge is designed for a trial speed, loaded, of 10 knots and in this connection the lengths of the entrance, parallel body and run are of interest, they being respectively 20 percent, 50 percent and 30 percent of the length between perpendiculars. The crew consists of 15 officers and men—7 on deck, besides the cook and 7 in the engine room.

The propelling machinery of the *Tydol* consists of two Winton single acting, four cycle Diesel engines, driving twin screws. Each engine has 6 cylinders, 14 inches in diameter by 18 inches stroke, and develops 415 brake horsepower at 247 revolutions per minute. The engines are arranged for air fuel injection and have the following attached auxiliaries: 3 stage air compressor, 4 cylinder cir-



Motor tanker Tydol built by Sun Shipbuilding and Dry Dock Company for Tidewater Oil Company

culating water pump, 2 cylinder lubricating oil pump, 6 cylinder fuel oil injection pump and single cylinder fuel oil service pump. The propellers are of manganese bronze, solid, three bladed and designed on the "circulation" principle. Their diameter is 6 feet and effective pitch 5 feet. The developed area of each propeller is 14 square feet.

The auxiliary power plant consists of two 4 cylinder, non-reversible Winton Diesels having cylinders 10 inches in diameter and 14 inches stroke and each developing 120 brake horsepower at 300 revolutions per minute. Each auxiliary engine drives through a clutch a 75 kilowatt, 230 volt, direct current Westinghouse generator.

There are installed in the machinery space the following motor driven rotary pumps, all of the Northern Fire Apparatus Company's manufacture:

- 1 reserve circulating water pump, 250 gallons per minute.
- 1 bilge pump, 75 gallons per minute.
- 1 fuel oil transfer pump, 75 gallons per minute.
- 1 lubricating oil pump, 125 gallons per minute.

Other auxiliaries include an electrically driven Brunswick Kroeschell $\frac{1}{2}$ ton refrigerating machine, a Sharples lubricating oil centrifuge, a "Lux" fire extinguishing system furnished by Walter Kidde & Company and an 11g motor-driven blower of 1,500 cubic feet per minute capacity for ventilating the machinery spaces and crew's quarters, in addition to which a 16-inch exhaust fan of the same make is

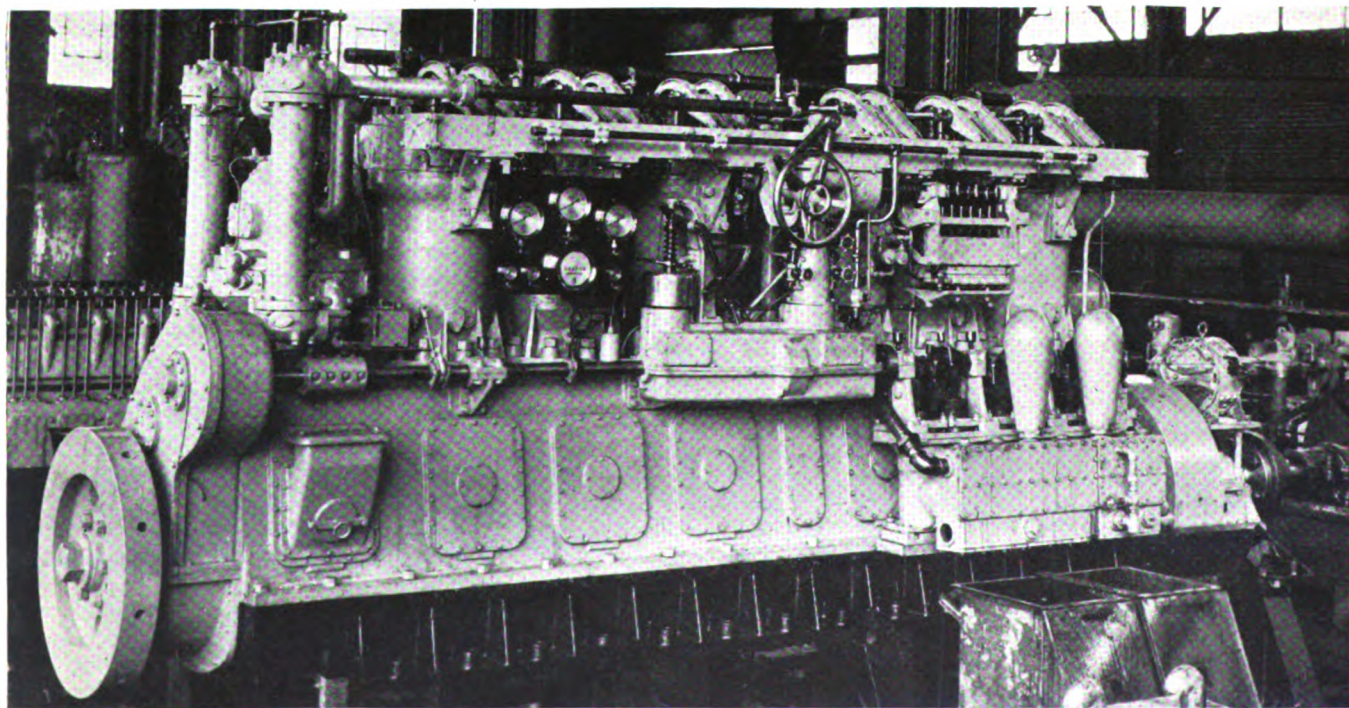
fitted in the after engine room ventilators to aid ventilation.

The emergency unit consists of a Hill, 3 cylinder, single acting Diesel using solid injection, developing 18 horsepower at 550 revolutions per minute, connected, through clutches, to a 12-kilowatt Westinghouse generator and a "No. 3" Winton 3 stage air compressor.

The cargo pumps are five in number, all of the "Northern" rotary type. Three, of 525 gallons per minute capacity each, are located in the main pump room, being driven by 50 horsepower Westinghouse motors in the machinery space. There is one motor for each pump, the power being transmitted by three shafts extending through the bulkhead between the engine and pump rooms. The two remaining cargo pumps, of 150 gallons capacity each, are installed forward, in the lubricating oil pump room where they are driven by 15 horsepower enclosed Westinghouse motors, the motor casings being ventilated to the deck. The steering gear is of the Allan Cunningham electric geared drum type. It actuates twin balanced rudders and is controlled by an electric telemotor.

Two windlasses are fitted, one forward and one aft. Both are of the Cunningham make and are motor driven, the cable for both bow and stern anchors being $1\frac{1}{8}$ inch.

The contract for the Tydol was placed in September, 1926, and the vessel was delivered to her owners in May, 1927.



One of the Tydol's main propelling engines—a 6-cylinder, Winton, four cycle, air injection, trunk piston, direct reversible Diesel designed to develop 415 brake horsepower at 247 revolutions per minute

went into service on September 9 of last year, with this unit installed, and she has since completed three extended fishing expeditions with highly satisfactory results. Service trials have shown that with a cut-off of 55 percent in the high pressure cylinder the same sea speed has been attained as with a 71 percent cut-off when the turbine was not in use, from which it is estimated that the saving in fuel due to the turbine is of the order of 28 percent. It should be stated that the *Sirius* has a boiler pressure of 220 pounds per square inch, and the aggregate temperature of her superheated steam is about 600 degrees F.

Although the machinery of the *Sirius* was specially designed and built to demonstrate the Bauer-Wach system, it

feld, owned by the Norddeutscher Lloyd, is a vessel of 9,350 tons deadweight, and before conversion was propelled by a triple expansion engine with cylinders 29¼, 47¼ and 78 inches diameter by 54-inch stroke. The boiler pressure is about 215 pounds per square inch, and the steam is superheated. Before conversion, the engine developed 3,200 indicated horsepower, and after installing the Bauer-Wach system the aggregate power was 4,000 indicated horsepower on the same coal consumption.

During the first voyage careful measurements of the condensed water were taken with specially calibrated tanks, and simultaneously indicator cards were taken from the main engine with and without the turbine connected to the

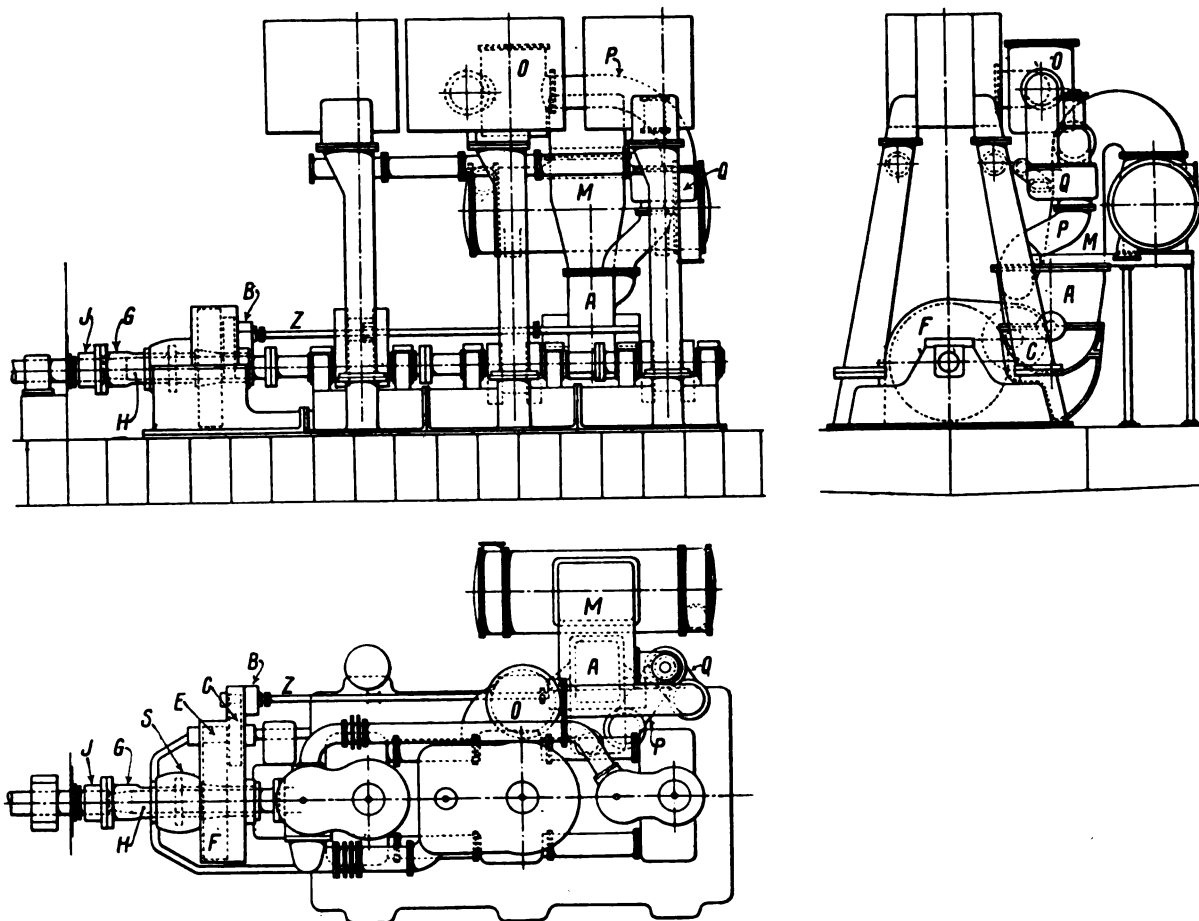


Fig. 2.—Typical conversion of triple expansion engine to Bauer-Wach system. Exhaust turbine at forward end of engine. Gearing adjacent to thrust block

is probably in the field of conversion of existing machinery installations that the principle will make its greatest appeal to owners. The question of the effect which the increased total power developed on the line shafting, due to the addition of the turbine, will have, has been given very careful consideration by the builders. Where the turbine is applied as a conversion, it is usual to increase the back pressure in the low pressure cylinder, which is, of course, equivalent to reducing its useful work, and to apply this higher pressure through the turbine. The intermittent impulse of the reciprocating engine is therefore partially replaced by the even torque characteristic of the turbine. The Germanischer Lloyd has already signified its willingness to give the shafting question favorable consideration, and there would appear to be no valid reason why other classification societies should not follow suit.

Since the satisfactory trials of the *Sirius*, two large steamers, the *Elberfeld* and the *Ockenfels*, have been fitted with the Bauer-Wach system as a conversion. The *Elber-*

feld. Without the turbine the engine indicated 2,571 indicated horsepower and with the turbine the corresponding indicated horsepower was 2,490 at equal steam consumption. Consequently the reciprocating engine showed a reduction of 81 indicated horsepower with the turbine working on the exhaust. The low pressure indicator card showed a back pressure of 0.3 atmosphere, while the exhaust turbine showed an inlet pressure of 0.28 atmosphere. Owing to the partially immersed propeller, with the ship in ballast trim, satisfactory torsional readings could not be taken from the shafting, and in consequence the additional turbine efficiency could only be calculated from the energy available between the inlet pressure of 0.28 atmosphere and the final pressure of 0.04 atmosphere.

In this case the turbine efficiency has been conservatively estimated at 68 percent. The steam consumption as measured was 12,400 kilos, and allowing 58 calories, after deducting the reciprocating engine cooling losses, the following may be deduced:

$$\text{Gain in B.H.P.} = \frac{58 \times 0.68 \times 12,400}{632}$$

$$\text{Gain in B.H.P.} = 774$$

Deducting reciprocating engine loss of 81 indicated horsepower = 73 brake horsepower, we have

$$\text{Net gain} = (774-73) \text{ brake horsepower} \\ = 701 \text{ brake horsepower.}$$

This means that at the same steam consumption the efficiency increase on 2,571 indicated horsepower or 2,370 brake horsepower is as follows:

$$\text{Increase in efficiency} = \frac{701 \times 100}{2,370}$$

$$\text{Increase in efficiency} = 29.6 \text{ percent.}$$

During the subsequent run further tests were carried out by direct measurements of the effective output at the shafting. In order to ascertain the increase in efficiency, a 3 hours' trial was run, firstly with the reciprocating engine alone, and then a further 3 hours' trial with the turbine working on the exhaust. These two trials were made at equal steam consumptions. Further trials were made at the same revolutions of the shafting without and with the turbine connected, in order to prove the reduction of specific steam consumption.

These tests indicated that the *reciprocating engine alone* consumes 2.64 tons per hour more steam than the Bauer-Wach combined turbine and engine, the saving in steam consumption from the use of the latter being 25.4 percent.

The second large vessel to be converted to the Bauer-Wach system was the 11,355 tons deadweight steamer *Ockenfels* of Bremen. Careful tests and measurements of steam consumption were carried out on this vessel, and the results were found to be equally as satisfactory as those from the *Elberfeld*.

As indicating how far the Bauer-Wach system has progressed from what may be described as the purely experimental stage, and as showing the measure of confidence which German owners place in the system, the following list of new vessels already ordered specially for propulsion by the Bauer-Wach combination system, is interesting.

The following is a list of vessels the conversion of which to the Bauer-Wach system has either already been completed or is at present in progress.

Type of Vessel	Owners	D.W. Tons	I.H.P.	Type of Vessel	Name	Owners	D.W. Tons	I.H.P.
Trawler	"Sirius" — Handels Bremerhaven.	G.m.b.H.	(Trawler) 700	Cargo steamer.	ss. <i>Elberfeld</i>	Norddeutscher Lloyd, Bremen..	9,350	4,000
Trawler	"Sirius" — Handels Bremerhaven.	G.m.b.H.	(Trawler) 700	Cargo steamer.	ss. <i>Ockenfels</i>	D. D. G. "Hansa".....	11,355	4,500
Cargo steamer.	"Neptun" Company, Bremen....	2,700	1,400	Passenger and cargo.	ss. <i>Greenbrier</i>	United Fruit Co., Boston.....	2,240	4,750
Cargo steamer.	"Neptun" Company, Bremen....	2,700	1,400	Cargo steamer.	ss. <i>Hermann Burmeister</i>	Oldenburg Portug. D.G., Ham- burg.	5,000	1,650
Cargo steamer.	"Neptun" Company, Bremen....	2,700	1,400	Passenger and cargo.	T.ss. <i>Antonio Del fino</i>	Hamburg Süd. D.G., Hamburg.	9,650	7,250
Cargo steamer.	"Neptun" Company, Bremen....	2,700	1,400	Passenger and cargo.	T.ss. <i>Cap Norte</i>	Hamburg Süd. D.G., Hamburg.	9,650	7,250
Cargo steamer.	Norddeutscher Lloyd, Bremen...	12,000	6,500					
Cargo steamer.	Norddeutscher Lloyd, Bremen...	12,000	6,500					
Cargo steamer.	Norddeutscher Lloyd, Bremen...	12,000	6,500					
Cargo steamer.	Norddeutscher Lloyd, Bremen...	12,000	6,500	Passenger and cargo.	ss. <i>Espana</i>	Hamburg Süd. D.G., Hamburg.	8,740	4,000
Cargo steamer.	Norddeutscher Lloyd, Bremen...	12,000	6,500	Passenger and cargo.	ss. <i>La Corona</i>	Hamburg Süd. D.G., Hamburg.	8,340	4,000
Cargo steamer.	Deutsche Dampfschiffahrts-Gesellschaft "Hansa," Bremen.	11,500	5,100	Passenger and cargo.	ss. <i>Vigo</i>	Hamburg Süd. D.G., Hamburg.	8,340	4,000
Cargo steamer.	Deutsche Dampfschiffahrts-Gesellschaft "Hansa," Bremen.	11,500	5,100	Cargo steamer.	ss. <i>Nevada</i>	Det Forenede Dampskibs Selskab, Copenhagen.	5,500	2,000
Cargo steamer.	Deutsche Dampfschiffahrts-Gesellschaft "Hansa," Bremen.	11,500	5,100					

The net economy to be achieved by conversion will depend upon the efficiency of the engine before conversion. In the most modern and efficient reciprocating engine of normal type, using superheated steam, the guaranteed saving will be from 15 to 18 percent fuel economy. In modern engines using saturated steam the fuel saving will be from 18 to 22 percent, while in low pressure engines with poorly

designed low pressure cylinders the saving will be from 25 to 30 percent.

With regard to the time necessary to liquidate the cost of conversion, it can be shown that where oil-burning boilers are used the entire cost will be wiped out in from one and a half to two and a half years. With coal-fired boilers the rate of saving is less, and three to four years will be necessary. The time required for conversion will depend on the nature of the alteration, and varies from two to eight weeks. For the conversion of a 4,000 indicated horsepower triple expansion engine a period of not more than four weeks will be adequate. The orders for the 13 new machinery installations are particularly interesting. The Hansa Line of Bremen is a progressive company which for the last few years has been concentrating exclusively on the building of motor cargo ships of the highest class. That this company should suspend their studied program of motorship building and order no less than four cargo steamers of 11,500 tons deadweight for propulsion by the Bauer-Wach system is noteworthy, and indicates the confidence which their converted steamer *Ockenfels* has inspired. The Norddeutscher Lloyd order for five 12,000-ton deadweight steamers also comes hard on the heels of that company's extensive motorship-building program, and is equally interesting. Finally, the decision of the Hamburg Sud. Company—one of the most successful shipping organizations today—to convert no fewer than five of their large passenger and cargo steamers, two of them high class twin screw liners, to the Bauer-Wach system appears to indicate that the new system is commercially sound.

S.S. LAURENTIC LAUNCHED.—The new White Star liner *Laurentic* was launched by Harland and Wolff, Belfast, Ireland, on June 16. The *Laurentic* is the second vessel of that name, the first having been sunk off the coast of Ireland in the war, when carrying troops and \$25,000,000 in gold. The new ship is larger than her predecessor being 18,700 tons register. She was designed for the St. Lawrence River trade, but is also adapted to winter cruising, and will make her first voyage, in January, on a cruise from New York to the Mediterranean. She will make a second Mediterranean cruise later in the winter, and will enter the Montreal-Liverpool service in the spring of 1928.

Her passenger capacity in cabin is 400 and for transatlantic trade 1,600. She has handsomely equipped tourist third cabin quarters, in addition to third class. The *Laurentic* is a triple screw vessel 604 feet long and 75 feet beam. Propulsion is by two reciprocating engines and a central low pressure turbine, which give her a sea speed of 16½ knots.

A New Type of Steam Engine

By Dr. Ing. Carl Commentz

THE engine with which this article, which is reproduced from *The Shipbuilder*, deals is of the reciprocating type, and is noteworthy on account of the very low values of the fuel and steam consumption figures obtained.

In its general construction the engine may be described as a double compound one of modified Woolf type having lever-connected pumps. Superheated steam is utilized as the motive power. The principal advantage lies in the direct flow of the steam from the high pressure to the low pressure cylinder without passing through a receiver or steam chest. This may be contrasted with the circumstances which obtain in the usual triple expansion engine, where considerable losses are experienced during the transference of the steam from one stage to another. A second point is that there is only one transference of steam in the case of a compound engine.

An engine of the type outlined, built by Messrs. Christiansen & Meyer, of Hamburg, has been fitted to a trawler—the *Claus Bolten*—built at Geestemünde by the Unterweser A.-G. This vessel has now been in service some months, and efficient results are reported.

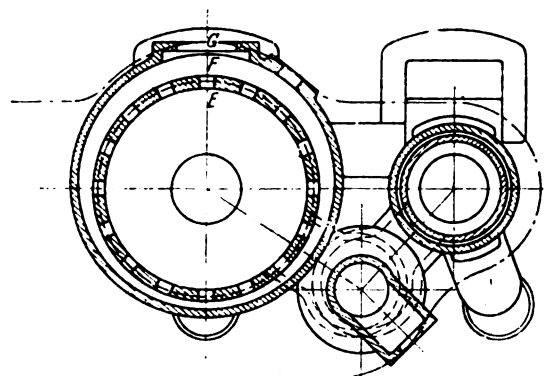
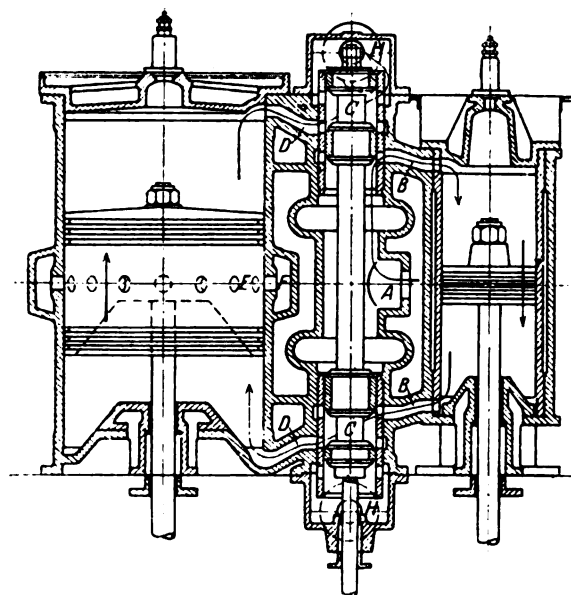
The engine of the *Claus Bolten* differs from the Woolf engine in two important details. There is only one reciprocating part governing the steam transference, *viz.*, a piston valve between the high pressure and low pressure cylinders. The second innovation is that the low pressure cylinder exhaust is by a series of valve ports arranged around the cylinder at half height. The details of the path followed by the steam may be gathered from the accompanying drawing. It enters at *A* into the distribution space of the piston valve and through the passage *B* into the high pressure cylinder, where it expands until the piston is in its lowest position. The steam then passes back through the passage *B* into the space *C*, and through the passage *D* into the low pressure cylinder, the piston of which is set at a crank angle of 180 degrees to the high pressure piston. When the low pressure piston is almost in its extreme position, the steam flows through the exhaust ports *E* into the peripheral passage *F*, and thence to the condenser. On the return stroke of the low pressure piston, there is a certain amount of steam trapped in the low pressure cylinder. If this were to remain, power would be absorbed in effecting its compression. In addition, therefore, to the peripheral ports *E*, arrangements are made so that the steam may exhaust through *C* into the space *H*, and thence to the condenser.

The economy of the engine is to be found in the small cooling surfaces of the passages between the two cylinders, and in the fact that the low pressure cylinder is operating on the unit-flow principle, which has very decided advantages. The cooling surface of the detrimental spaces amount to only 63 percent of the total cylinder surface in the high pressure cylinder, and to 60 percent in the case of the low pressure cylinder. These give rise to a very small entrance condensation. The economy of steam engines is known to be very sensitive to such factors.

The other parts of the engine are of normal design and construction. The high pressure cylinder has a special liner. The engine consists of two units of the type described mounted on the same bedplate, the cranks of the two engines being arranged at an angle of 90 degrees. Lubrication is by mechanical means. The thrust bearing is of the single collar type. As there is only one steam distribution chamber for each part of the engine, and as this is moreover arranged slightly to one side, the length of the engine is quite small in spite of the four cranks.

The dimensions of the cylinders for the *Claus Bolten* are 315 millimeters and 360 millimeters diameter, by 660 millimeters stroke (12.4 inches and 14.2 inches diameter, by 26-inch stroke), and the engine is capable of developing 525 indicated horsepower at 106 revolutions per minute, the boiler pressure being 14 atmospheres (200 pounds per square inch). The heating surface is 165 square meters (1,775 square feet), the boilers having natural draft. The grate area is 4.6 square meters (50 square feet), and the superheating area 68 square meters (731 square feet).

On a six-hour trial trip, the fuel consumption corresponding to 525 horsepower amounted to only 0.52 kilo-



The modified Woolf steam engine

grams per indicated horsepower-hour (or 1.15 pounds in English units), the coal being good Westphalian. The vacuum was 84 percent, and the feed water was heated to a temperature of 75 degrees C. (167 degrees F.).

On a speed trial over a measured course the engine developed an indicated horsepower of 673 at 115 revolutions per minute, a speed of 11.5 knots being attained.

In considering these results, it must be recollected that the engine is of very small dimensions and that larger plants should show still more favorably, especially if forced draft and other special measures for economy are applied.

It is intended to build the engine to a standardized scheme, including units of indicated horsepowers varying from 400 to 2,000. The revolutions will vary from 110 in the smallest to 70 in the largest installations.

The operation of the engine in the trawler *Claus Bolten* has proved to be very simple, and its quick starting under full load has been found of special advantage when setting out the nets and boards.

The fuel consumption realized on the trials has been confirmed by the subsequent fishing trips. In this connection, it may be mentioned that the *Claus Bolten*, of which the bunker capacity is 210 tons, may steam a distance of 8,000 to 8,400 miles, remaining at sea for so long as 34 to 36 days, without the need of rebunkering.

Fore River Yard Conducts Evening Classes in Shipbuilding for Employees

THE Fore River Plant of the Bethlehem Shipbuilding Corporation, Ltd., at Quincy, Mass., has been conducting evening classes in shipbuilding for employees, in their Yard Educational Building during the past winter and spring. In this work they have had the co-operation of the Bureau of Education of the State of Massachusetts and the Evening Industrial School Division of the City of Quincy. The classes have been held immediately after work for a two-hour period, each class meeting twice weekly for a duration of twenty weeks.

In projecting the idea of the school the depression in shipbuilding was at first looked upon as an unfavorable influence, but the optimistic philosophy of Charles M. Schwab, who says, "In time of reduced business prepare for more business," was followed with most fruitful results.

Aside from the regular instructions a series of lectures by draftsmen, departmental heads and naval officers was arranged. The work was divided into structural and me-

chanical divisions with the instruction and lectures scheduled to meet the particular need and program of each class. The younger men of the Plant were, as usual, well represented but a particularly encouraging feature of the courses was the attendance of many mature-minded men of middle-age, who proved to be ideal students due to their ardent interest in the studies. The latter phase revealed that a demand exists among this type of employee for specific as well as general studies in blueprint reading, elements of design and shipyard methods.

As the school developed it was found that dual results were being obtained; first, in imparting knowledge to the receptive minds of the students, and second, the men who participated as lecturers were animated with the satisfaction that accrues to those who serve their fellows.

Among those who supported the idea of the school and who actively participated in the work were the following men well known in the marine field:

William Binley, Jr., naval architect of the Fore River Plant.
Captain Louis Shane, U.S.N., inspector of machinery.

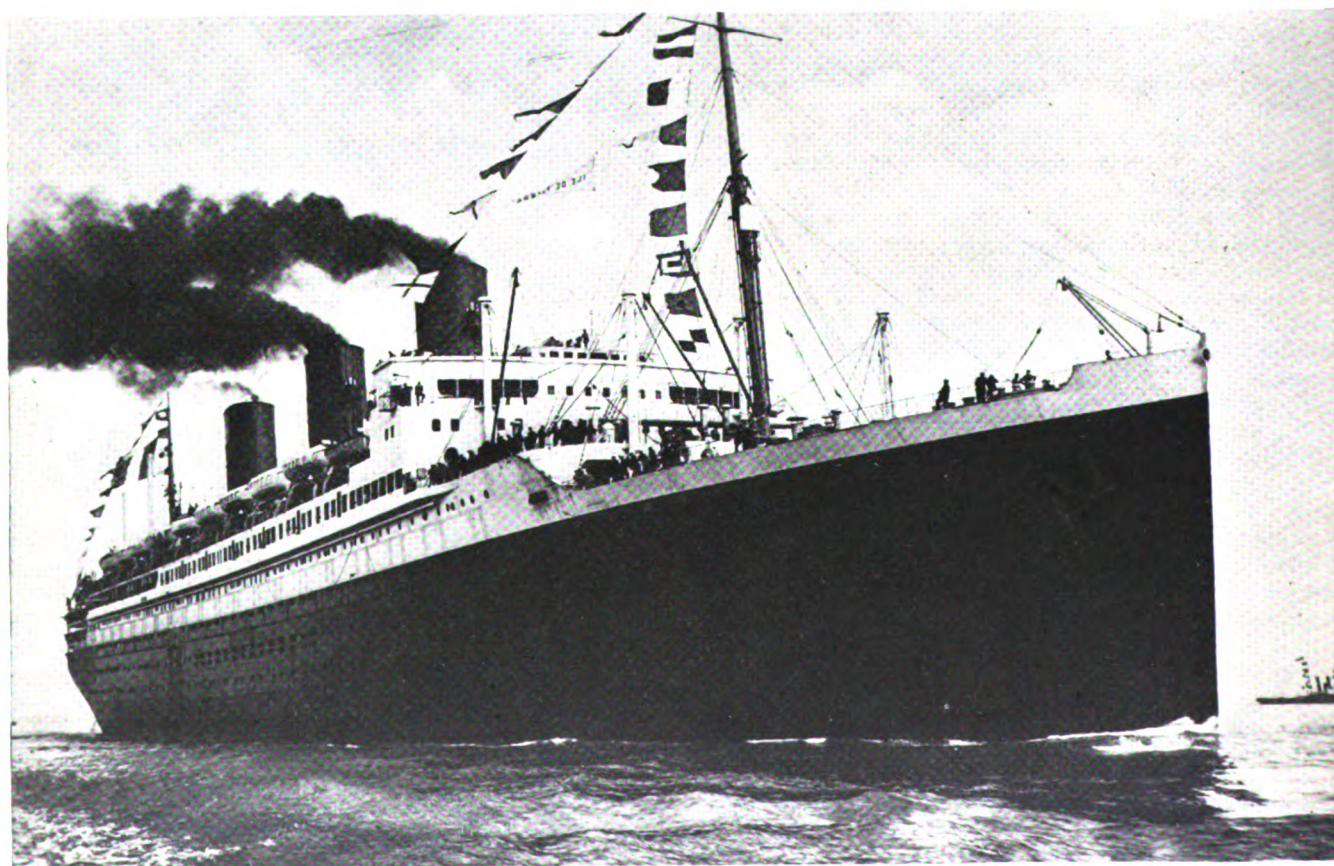
Lieutenant A. S. Pitre, C.C., U.S.N., attached to the staff of Commander Waldo P. Druley, C.C., U.S.N., superintending constructor.

G. A. Booth, superintendent of order department
Thomas J. Larkin, construction foreman, U.S.S. *Lexington*.

A. J. Grassick, foreman loftsmen.
A. W. Lawton, foreman coppersmith.
Harry Jemison, foreman patternmaker.

Plato Waplington and C. L. Wenkenbach of the drafting rooms.

The organization of the school came under the supervision of Harry E. Parker, service manager of the Fore River Plant with Angus D. MacDonnell of the hull drafting room as instructor.



S. S. Ile de France, new 43,000-ton flagship of the French Line, on her trial run from St. Nazaire to Havre. She sailed from Havre on her maiden voyage to New York on June 22, arriving in New York on June 28

A New Form of Filtrator

Important improvements in the system of filtrator flaxseed boiler treatment

THE Filtrators Company, 96 Liberty street, New York, whose apparatus for preventing and removing boiler scale was described in MARINE ENGINEERING AND SHIPPING AGE for September, 1925, page 640, has developed and placed on the market a new form of this apparatus.

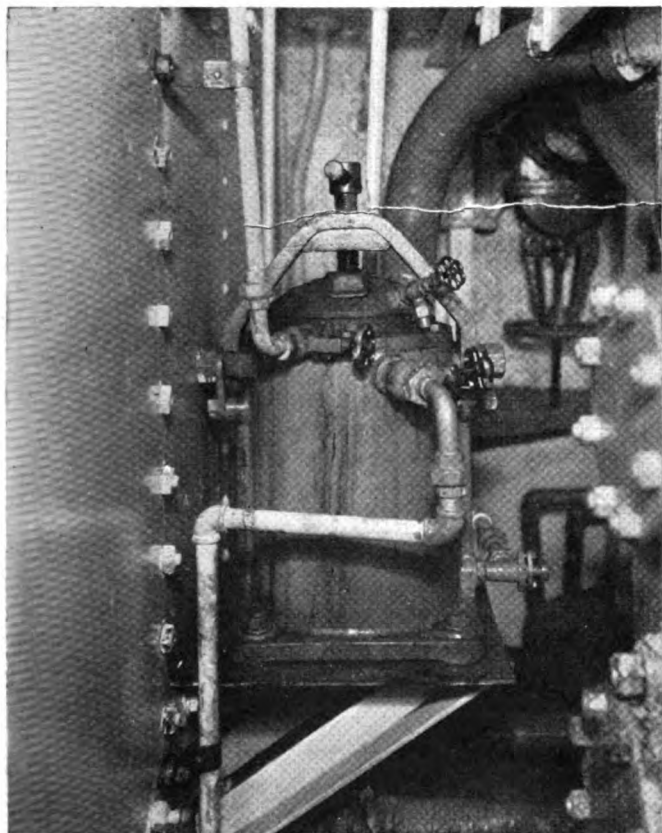
It will be remembered that the original filtrator was an apparatus arranged to inject into the boiler a small quantity of an emulsion of flaxseed, this operating to keep in sus-

ables the apparatus to be located in the engine room where it is always under the eye of the engineer and also renders much more convenient the renewing of the flaxseed.

The old method of installing the filtrators directly connected to the boilers necessitated the installation of one filtrator for each boiler. The new type of filtrator feeds the flaxseed emulsion into the filter box and therefore only one filtrator is required to take care of all the boilers on a ship. The new filtrator is made of correspondingly larger size.

FLOW OF EMULSION VISIBLE

The flow of the emulsion into the filter box is accomplished by means of a thermostatic valve which can be so regulated as to allow the emulsion to flow through a sight



Water cooled filtrator installed in engine room of S. S. Colorado of the Mallory Steamship Company

pension all substances which ordinarily would be deposited on the heating surfaces in the form of scale. The emulsion was formed in a small air-cooled closed tank placed on deck, the flaxseed being in a perforated cylinder inside the tank, and the latter filled with steam. The emulsion thus formed drained from the bottom of the tank into a small pipe and so on down into the boiler. A large number of this original form of filtrator have been installed on board ship and are giving very satisfactory service.

The most important property of the emulsion of flaxseed is that its operation is entirely mechanical and not chemical, in consequence of which it never attacks the boiler tubes or plate or sets up corrosive action of any kind.

THE NEW FILTRATOR

The new form of filtrator which is illustrated on this page operates on precisely the same principle as its predecessor, the main difference being that a water jacketed, instead of an air cooled, emulsion tank is used. This en-

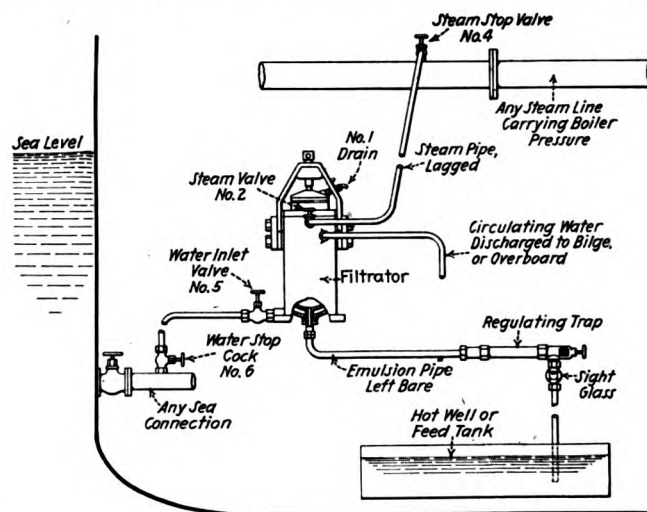


Diagram of water cooled filtrator, regulating trap installation

glass and to shut off the passage of steam. By observing the sight glass the engineer of a ship can at all times see the emulsion flowing into the boiler feed and this is of the greatest importance as the continuous treatment is one of the major reasons of the successful filtrator treatment of boilers.

CAN BE INSTALLED WHILE BOILERS ARE UNDER PRESSURE

The new type of filtrator can be installed while boilers are under pressure which removes most of the former inconvenience of installation.

As an indication of the satisfactory service rendered by the filtrator, the following partial list of companies upon whose vessels it is in use is of interest:

A. H. Bull & Company, Baltimore & Ohio Railroad, Clyde Steamship Company, Cities Service Transportation Company, Dalzell Towing Company, Galena Navigation Company, Mallory Steamship Company, C. D. Mallory & Company, Moore & McCormack Company, Neptune Line, New York & Porto Rico Steamship Company, O'Brien Bros. Towing Company, Portland Trawling Company, Southern Steamship Company, Standard Oil Company (N. J.), Henry Steers, Inc., Tidewater Oil Company, United States Shipping Board, United States & Australasian Line, United Fruit Company and United States Tankship Corporation.

New Condenser Packing Tool

A NEW and efficient development in condenser tube packing tools has been brought out and is being used by Blain & Company, Inc., 119-121 Sixth Street, West New York, N. J., who specialize in condenser tube packing service.

The tool is the invention of S. F. Blain of Jersey City and is the result of much thought and time spent in its per-

used in transatlantic service. The *J. M. Connally* is being outfitted at the Point Breeze plant of the Atlantic Refining Company, Philadelphia, and will probably go into service by the first of July. The other two vessels are being reconditioned by the Alabama Drydock & Shipbuilding Company at Mobile, Ala., and will probably be in service sometime during July or August.

The power plants on each ship will consist of Ingersoll-Rand Diesel engines and electric equipment furnished by

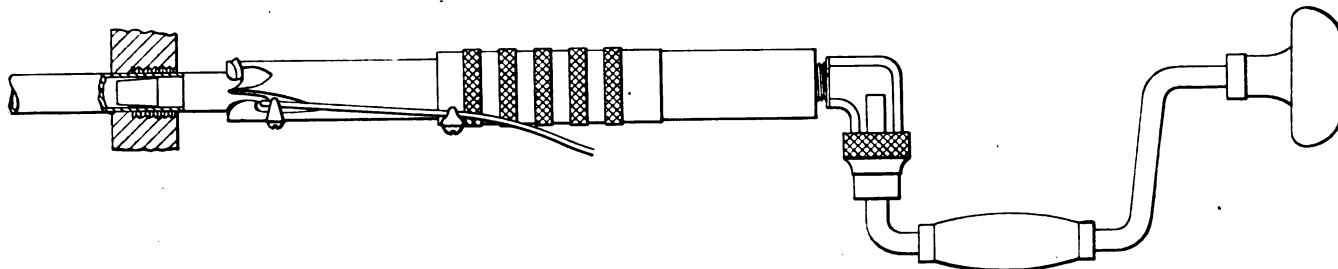


Fig. 1.—Tool with packing in place and guide spindle inserted

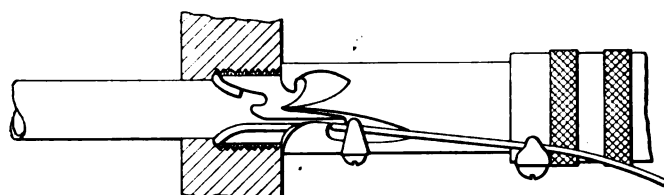


Fig. 2.—Packing placed at base of packing box

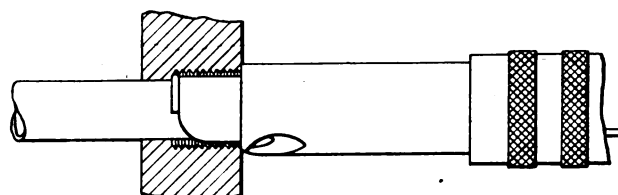


Fig. 3.—Slight left turn prevents doubling over if end of lace is left too long when threading tool

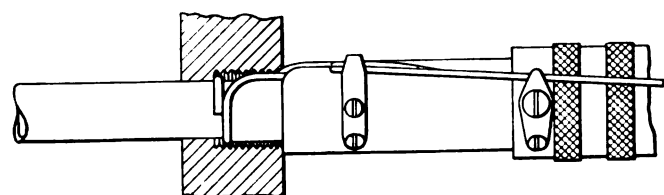


Fig. 4.—During first right turn slightly release pressure until packing overlaps, then resume pressure turning right

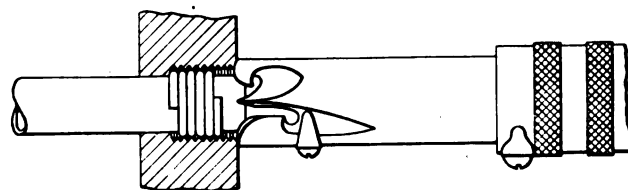


Fig. 5.—Showing perfectly packed tube after a few right turns of the tool

fection. It is thoroughly efficient for the work it was designed to do. Among its many good features are the uniformity of packing and the fact that the larger sizes of braid packing are easily applied.

A turn of packing is held by the tool, the end of which is then inserted into the tube and the tool rotated. Each revolution of the tool winds and compresses a turn of packing into the box in the one operation.

Condensers packed by this method have withstood the usual test before the ferrules were replaced.

New Atlantic Refining Tankers Soon in Service

THE Diesel-electric machinery is now being installed in the three tankers soon to be put in service by the Atlantic Refining Company. These vessels, purchased last year from the U. S. Shipping Board, are being reconditioned for this purpose, and will be among the largest of their kind in the world.

The three ships, the *Sharon*, *J. M. Connally* and *Besemer*, each have a deadweight of 7,000 tons. They were formerly operated by steam and, when completed, will be

equipped with three 850 horsepower, 225 revolutions per minute, Diesel engines, each driving a 525-kilowatt, 250-volt generator for propulsion and a 50-kilowatt, 250-volt auxiliary generator for excitation and ship's auxiliary power. The propulsion generators will supply power to an 1,800 horsepower, 90 revolutions per minute, 750-volt, double motor on each boat, direct connected to the propeller shaft. The control will be of the Ward-Leonard type arranged for operation either from the pilot house or the engine room, the panels being of the dead-front type throughout.

The tankers will be fitted with electric auxiliaries, all of which will be driven by General Electric motors. These auxiliaries will include two 80 horsepower cargo pumps, one 45 horsepower windlass, one 30 horsepower mooring winch, one 30 horsepower fire and bilge pump, two 15 horsepower air compressors, a balancer set and numerous small pumps—as well as a 25-kilowatt auxiliary generator driven by a small oil engine which will be used for emergency and in port.

THE JAPANESE GOVERNMENT has agreed to make a loan to the Kawasaki Dock Yards of Tokyo of about \$14,000,000 for completion of its naval contracts.

Yacht Railways and Turntable at Fairhaven

OPPPOSITE the old whaling town of New Bedford, Mass., at Fairhaven, is one of the most interesting yacht yards along the Atlantic coast. This is the new yard of Peirce & Kilburn, which is equipped with two yacht railways, one of 75 tons and the other of 240 tons capacity.

Realizing the importance of dependable service at all times, particularly during the rush of work when a number of boats are to be hauled out in preparation for races, an ingenious arrangement has been devised in connection with the 75-ton railway so that a considerable number of vessels may be hauled out and repaired at one time. This is

Critical Speeds

EXPERIENCES with the propeller shafts of submarines, which broke at certain speeds as the result of vibrations, gave rise to scientific examination of the conditions causing the occurrence of these phenomena, with a view to being able to give definite instructions to operators as to which critical speeds to avoid. This problem has been solved by several German scientists, among them Gumbel, Geiger and Kutzbach, all of whom devised methods of calculating the critical speeds resulting from the elastic deformation of shafts.

Professor Stodola, of Zurich, has called the attention to a new critical speed, which is not due to the elastic deformation of the shaft like the critical speeds hitherto known. This is caused by the elasticity of the layer of oil, or, to



A turntable in conjunction with a 75-ton marine railway facilitates the hauling out of a large number of vessels for repair at the same time at the Pierce & Kilburn yacht yard

accomplished by means of a turntable situated at the in-shore end of the railway track from which radiates a system of spur tracks like the spokes of a wheel. The yachts are hauled out, then run ahead on the turntable and the table revolved to line up with the desired track where the craft is pulled to one side where work can proceed uninterrupted. This frees the railway and turntable, leaving them available for either hauling or launching. By the use of a number of independent cradles, the number of yachts that may be handled over this turntable is almost unlimited.

The larger 240-ton railway has a cradle 100 feet long and 32 feet wide made up in two sections with a track of sufficient length to give 13 feet over the keel blocks. This cradle is designed with the main cross beams of steel to give sufficient strength and rigidity for hauling out scows, tow boats and fishermen as well as the heavier yachts. Both of the railways are operated electrically and the control is centralized in a control house where the operator has an unobstructed view.

The original idea for the use of a turntable was conceived by Mr. Clifford Kilburn. His ideas were developed and the railways and turntable designed and constructed by The Crandall Engineering Company, of Boston, Mass.

speaking more accurately, the oil wedge, in the bearing. The modern conception of the conditions obtaining when a shaft is running in the bearing is that it floats, as it were, on the oil. Now, if the field of forces in the oil wedge is known accurately enough for practical purposes, the forces acting upon the shaft, and, consequently, the equations of motion can be determined for each separate case. The equations for the close vicinity of the neutral position permit of inferring that the shaft is either in stable or unstable equilibrium according to its position in the bearing. If an external disturbing force acts upon the shaft which is in a state of equilibrium, forced oscillations will be the result. Theoretically, the amplitudes of these vibrations will grow infinitely large if the frequency of the disturbing force happens to coincide with the natural frequency of the shaft. Dr. Hummel has elaborated Stodola's theory on a larger basis and found it confirmed by experiments. (The elaborated theory has been set forth in full in a new booklet published by the Verein deutscher Ingenieure).¹ The motion of the shaft was transmitted to a mirror and then photographed.—*Engineering Progress*.

¹ Critical speeds as the result of the elasticity of the lubricant in the bearing by Charles Hummel. No. 287 of the Research Work Series from the field of engineering. Published in Berlin 1926 by VDI-Verlag G. m. b. H., 48 pages.

Rich Audible Smoke Detector Perfected

WALTER Kidde & Company, Inc., New York, has developed an audible smoke detector. In an instrument that uses principles similar to those of television and of the Rich system sensitivity of an astounding degree has been attained. Smoke, in such an invisible quantity as remains in the breath, after exhaling a puff from a cigarette, will operate the alarm gong. The mere presence of smoke not only actuates the alarm gong but simultaneously causes the detector automatically to release the extinguishing system, close fire doors, etc.

This new device is known as the Rich audible smoke detector. It consists of a detecting cabinet and a pipe system connecting this cabinet with the spaces protected. Samples of air are continuously drawn through these pipes from each space by means of an exhaustor. The presence of smoke in this air operates the alarm.

The Rich audible detector was first exhibited at the



Cabinet (open and closed) of new Rich audible smoke detector

National Electric Light Association convention at Atlantic City last month. For the present it will be offered only for fire detection in generators in power plants, but after a satisfactory service record has been obtained it will be introduced into the marine field for cargo fire detection.

Portable Crank Pin Turning Machine

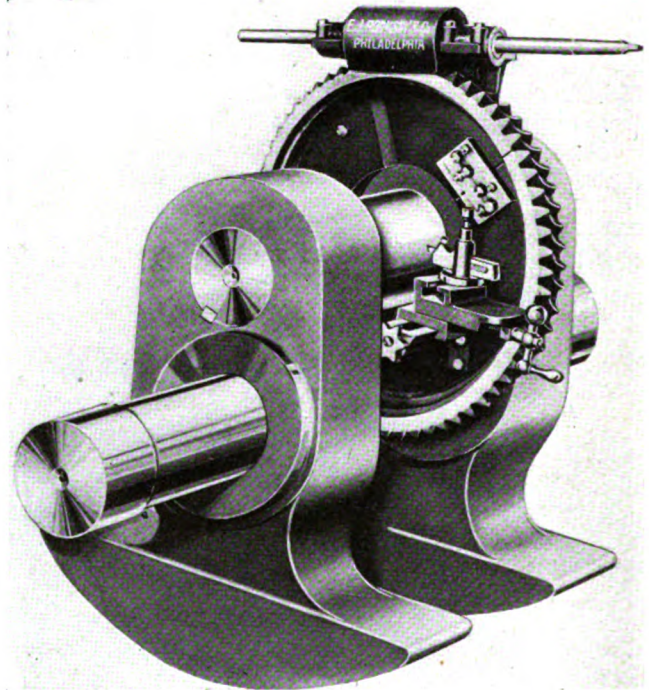
A NEW portable crank pin turning machine for truing up worn center crank pins has recently been designed and put on the market by E. J. Rooksby & Company, 1042 Ridge Avenue, Philadelphia, Pa. The machine is adaptable for truing up the center crank pin on any steam, gas or Diesel engine for stationary or marine work.

The illustration shows the front view of the machine which is composed essentially of a stationary and revolving disk. The revolving disk is supported in the stationary disk by a keeper ring which provides a substantial journal bearing as well as the thrust bearing. The stationary disk is secured to the inside face of the crank cheek by adjusting screws and the studs and clamps.

The revolving disk is driven by a worm gear of ratio suitable for either air drill or electric motor and carries a substantial arm with a slide block and cross-slide having a tool post and turning tool, giving a feed both ways on the

pin provided by a star feed. The cross-slide, for setting to the correct diameter, is similar to the slide block of a lathe.

Both of the disks and the keeper ring are, of course, split in order to get the machine over the crank pin. The joints between the two halves of the disks are provided with a tongue and groove accurately machined and carefully fitted so that they may be readily assembled on the crank pin, at



Center crank pin turning machine

the same time keeping these parts of the machine perfectly true.

The machine is bolted to the finished inside cheek of the crank which sets the machine perfectly square with the pin. Provision is made for setting to the original center by a supporting cross-bar with a center and sleeve having screw adjustment similar to the tail-stock of a lathe.

This sets the machine perfectly square and central with the original turning of the pin. The manufacturers of this machine have for many years been making crank pin turning machines for side crank pins and they are thoroughly familiar with the entire proposition of truing up crank pins with portable machines.

The machine has a capacity to turn crank pins from 8 to 11½ inches in diameter and which are from 7½ to 9 inches long.

Physical Examination of American Seamen

CHAIRMAN T. V. O'Connor, of the United States Shipping Board, announced on June 9 that arrangements have been perfected in all ports of the United States whereby American seamen will hereafter receive thorough physical examinations prior to shipping on vessels of the American merchant marine, and medical departments have been installed in the different Sea Service Bureaus over the country. In ports where the Shipping Board does not have its own physicians, physical examinations will be given by regular medical officers of the United States Public Health Service, acting in conjunction with local officials of the Shipping Board.

Engine Room Auxiliaries Installed on the Iroquois and Shawnee

Name	Number	Type	Size	Make	Remarks
Main circulating pumps.....	2	Centrifugal	31"	Worthington	Compound engine
Auxiliary circulating pump.....	1	Centrifugal	8"	Worthington	Single engine 5"x6"
Main air pumps.....	2	Twin beam	12"x30"x21"	Worthington	
Auxiliary air pump.....	1	Vertical simplex	8"x16"x12"	Worthington	
Feed pumps.....	2	Vertical simplex	18½"x13½"x24"	Worthington	One auxiliary
Ballast pump.....	1	Vertical duplex	10"x12"x12"	Worthington	
Fire and general service pump.....	1	Vertical duplex	14"x11"x12"	Worthington	
Bilge pump.....	1	Vertical duplex	7½"x9"x10"	Worthington	
Sanitary pump.....	1	Vertical duplex	10"x12"x12"	Worthington	
Fresh water pumps.....	2	Vertical duplex	7½"x7½"x6"	Worthington	
Ice machine circulating pump.....	1	Vertical duplex	7½"x7½"x6"	Worthington	
Scuttle butt circulating pump.....	1	Vertical duplex	5¼"x3½"x5"	Worthington	In ice machine room
Evaporator feed pump.....	1	Vertical duplex	5¼"x3½"x5"	Worthington	
Fuel oil service pumps.....	2	Vertical duplex	9"x6"x10"	Worthington	Between engine room and after fire room
Oil transfer pump.....	1	Vertical duplex	9"x6"x10"	Worthington	Between engine room and after fire room
Lubricating oil pumps.....	3	Vertical simplex	8"x10"x12"	Worthington	In engine room
Hot water circulating pump.....	1	Vertical duplex	5¼"x3½"x5"	Worthington	
Brine circulating pumps.....	2	Vertical duplex	7½"x7½"x6"	Worthington	
Boiler feed injectors.....	2	Double tube	2½"	Metropolitan	
Feed water heater.....	1	Two-pass.	121,000 pounds per hour.	Reilly	Cast iron shell
Evaporator.....	1	Submerged type	30 tons per 24 hours.	Reilly	Steel shell and cast iron manifolds
Auxiliary condenser.....	1	Cylindrical	1,000 square feet.	Newport News	
Lubricating oil coolers.....	2	Multiwhirl	425 gals. per minute.	Griscom-Russell	
Fuel oil heaters.....	2	Reilly		Griscom-Russell	
Vacuum augmentors.....	2				
Oil purifier.....	1	De Laval		De Laval Separator Co.	
Forced draft blowers.....	4			Sturtevant	

Clyde Liners Iroquois and Shawnee

(Continued from page 382)

to develop 8,500 shaft horsepower at 1,810 revolutions per minute, the corresponding propeller revolutions being 150 per minute. Each shaft is fitted with a Kingsbury thrust block. The propellers are of solid manganese bronze, 13 feet 3 inches diameter, and 14 feet 5 inches pitch. There are two main condensers each containing 6,500 square feet of cooling surface and an auxiliary condenser of 1,000 square feet cooling surface.

Steam is supplied at 275 pounds per square inch and 100 degrees superheat by 6 Babcock and Wilcox oil burning watertube boilers. Each boiler is equipped with 7 model G2M Diamond soot blower units and 4 Babcock and Wilcox oil burners. Four forced draft Sturtevant blowers are installed.

The auxiliaries installed in the machinery space are listed at the top of this page.

A New Hose Clamp

A NEW hose clamp, which is of especial interest because of its simplicity, the speed with which it may be applied or removed and the fact that one size will fit an extremely wide range of hose sizes, is now being in-



Fig. 1

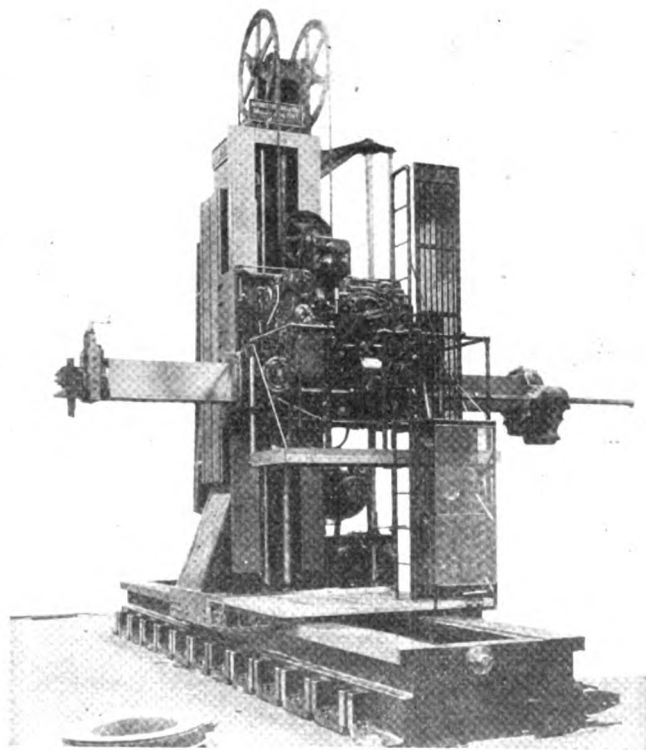


Fig. 2

troduced to the trade by the National Clamp Company, 16 East 41st Street, New York. Fig. 1 shows the clamp open. It consists of a band upon which is embossed a series of transverse ridges and depressions, forming in effect, a toothed rack. The screw engaging with this toothed band is mounted on a trunnion. In applying the clamp, the band is slipped over any part of the hose and compressed by hand. Allowing the screw to swing into the position shown in Fig. 2 and taking a few turns with a screwdriver tightens the band.

Combination Machine Tool

A PRODUCTION tool designed and built for the complete machining of heavy iron and steel castings and for heavy duty repair work has been developed by the Morton Manufacturing Company, Muskegon Heights, Mich. The machine may be equipped with floor plates, work tables, milling attachments, right angle boring attachment, standard and traveling head boring bars, a reversible head for either push or pull-cut, push and pull-cut slotter bars and other special equipment. Morton traveling head planers are manufactured with 60 inches, 72



Combination planing, boring, milling and slotting machine

inches and 84 inches of cutting stroke with any height of column and any length of bed. Larger machines may be built for special work. The planer may be used either as a stationary or portable tool. It is reversible and may be quickly changed into a large horizontal traveling head

slotter. The milling and boring feeds may be quickly changed to meet conditions. The machine is designed to vertical mill and bore at right angles with the ram at any 90-degree point of arc. It is stated that these planers are specially adapted for the complete machining of large rolling mill housings, engine beds, air compressor and refrigeration castings, turbine and hopper section castings, the key seatings of large flywheels and gears and for general use in the repair shops of steel mills, shipyards and contract shops where heavy machining is done.

Putting an End to Water Hammers

A DEVICE has recently been perfected by the Armstrong Machine Works of Three Rivers, Mich., whereby the valve of a steam trap is automatically held open until steam temperatures have been established, thus eliminating the danger and annoyance of water hammer without recourse to troublesome and wasteful by-passes.

This device makes use of a thermic unit which has been extensively used in effecting heat regulated control on many kinds of automatic apparatus. It consists of a strip of metal made of laminations which cause it to bend when it undergoes temperature changes.

This unit is applied to the float of the steam trap in such manner that when the trap is cold the laminated strips hold the valve of the trap wide open. As soon, however, as the cold water and air contained in the line have blown through the open valve the temperature in the trap rises and the consequent expansion of the laminated strip causes it to bend so that it no longer holds the trap valve open but permits the float and lever system of the trap to function in the normal manner. The device is usually set so that as long as the temperature is below 200 degrees the valve is held open while at all temperatures above this point the trap functions in the normal way.

The thermic unit is entirely contained inside the steam trap and does not need attention or adjustment. Due to its simplicity the cost of the entire unit is generally less than that involved in the installation of an adequate by-pass and so in addition to the economy effected in steam saving and saving due to the elimination of water hammer damage as well as the saving of the engineer's time a distinct economy is effected both in installation costs and operation.

Westinghouse Adds New Switches to Standard Lines

NEW designs of switches have been added by the Westinghouse Electric and Manufacturing Company to their standard WK-60, WK-61, WK-62, and Midget lines. In addition to this a new range switch for flush or surface mounting has also been introduced that has many advantages for range use.

A complete set of styles including solid neutral switches of the three blade, two fuse type is the addition to the WK-60 group. The WK-62 group has been augmented by the addition of four-wire switches consisting of four blades and three fuses for use on three-phase, grounded neutral systems and five-wire switches with four blades, four fuses with solid neutral block for use on two phase interconnected grounded neutral systems. The new WK-61 switches consist of a 600 ampere size switch and an addition of a complete set of ratings in double throw switches, fusible at each end. N. E. C. fusible switches, solid neutral switches and special designs for small motor work have been added to the Midget and type 00 line of switches.

Abstracts of Articles Translated from the Foreign Press

New Method of Bulkhead Construction

This article describes a new method of transverse bulkhead construction invented by Mr. Pierrottet and used in the steamer *Priaruggia*. The plates, slightly curved and flanged, are fitted vertically, the height of the plates being equal to one deck height and the width equal to the distance ordinarily required between the stiffeners. Both vertical edges of the plates are flanged and serve as stiffeners. This work is done by means of a hydraulic press. Only the small boundary plates at the ship's side need heat treatment. By this method of construction the weight of the collision bulkhead came to a little more than 3 tons as against 4 tons with the ordinary method of construction. The bulkhead was 25 percent stronger than the conventional type of bulkhead and was approved by the Registro Italiano.

In this particular case 1,550 rivets would have been required with the ordinary method of construction as against 1,300 with the new method of construction. The cost of construction was 20 percent less than with the ordinary bulkhead.—*La Marina Italiana*, June, 1926.

Welding

The fundamentals of welding are given and compared with riveting. Several examples are given of its adoption in ship, car and engine building. Arc welding is not easily applicable where the structural parts to be connected are light, that is for thickness under 0.1 inch. Only in a few cases the author holds has the lap weld proved stronger than the edge to edge weld. In all cases of small structural work the cost of welding is about 80 percent of the cost of riveting. To avoid failures the structure should be carefully studied to avoid maximum bending moments near the weld. A table is given showing the results of a great number of tests carried out by the author on electric welded bars. The yield point for shipbuilding material of a breaking strength of 25 to 28 tons per square inch appeared in the tests at an average stress of 14 to 21 tons. Test pieces in torsion tests broke outside of the weld. The strongest weld in all cases is the arc weld. Several pictures are shown of electric welded barges. The difficulty in welding large ships lies in the complicated structure. In a welded hull the vibrations are much less marked than in the riveted hull.—*Zeitschrift des Vereines Deutscher Ingenieure*, October, 1926.

Diesel Tugs for the Government

In Germany, as in this country, it has been found that Diesel tugs are more economical than steam tugs. A great number of these craft have been built during the past few years owing to the tremendous development of inland waterways in Europe. The most recent type, of which a number has been built, was decided upon after very careful investigation. The dimensions of this boat are:

Length overall	67 feet 6 inches
Length between perpendiculars.....	61 feet 0 inches
Beam, molded	16 feet 6 inches
Depth, molded	6 feet 7 inches
Draft	5 feet 9 inches
Towing velocity	2.7 knots

The tug has a cruiser stern and a specially constructed stem for the purpose of ice breaking (6 inches thickness of ice). The horsepower of the motor is 160; revolutions per

minute, 250 (Deutzer Motorenfabrik A. G.); oil consumption (specific gravity 0.85), 0.385 pound per horsepower hour.

Extensive model experiments were carried out in the Hamburg tank giving the following results:

Resistance in deep water so small as to give the boat a speed of $5\frac{1}{2}$ knots for 14 horsepower. The resistance when towed in a tank having the profile of a canal with shallow water was found to be doubled at $5\frac{1}{2}$ knots and is six times the deep water resistance at 7 knots. For the towing speed 2.7 knots no difference in resistance between canal and deep water was found. Experiments were carried out with the full sized ship towing a number of barges to find the most efficient propeller. A contrapropeller was fitted and the best propeller was found to be one with 4.48 feet diameter and 3.4 feet pitch, four bladed.—Z. V. D. I., January 1, 1927.

Strength and Freeboard of Oil Tankers

By Dipl. Ing. Heberling

An interesting article on the strength and freeboard of oil tankers. A reduction in freeboard in these vessels is advocated as it has been found through several calculations that the maximum bending moments on these vessels when the freeboard is reduced as much as 15 percent remains constant. A great number of bending moment diagrams are worked out for different conditions of loading for a 12,000-ton tanker and a 12,000-ton freighter. In a fully loaded condition, assuming the vessel on a standard wave, the calculated bending moments are:

	Wave Crest PL	Wave Hollow PL
Freighter	43	62
	PL	PL
Tanker (engines aft)	47	41.6

Where P = displacement and L = length of ship.

Calculations are then made for the tanker with oil in the summer tanks, starting with the end tanks and gradually loading all summer tanks from the ends towards amidships. The worst condition in a wave hollow is when the middle summer tanks are loaded with heavy oil and the end tanks

with light oil, giving a maximum BM = $\frac{PL}{38.4}$. The same

case with 15 percent decrease in freeboard, the top of the wave profile in this case going slightly over the deck amidships, gives same bending moment. The speed of the vessel in question is 11 knots. By decreasing the freeboard 10 percent, additional cargo of 725 tons can be carried and by decreasing it 18 percent, 1,080 tons can be carried. The author holds that in the latter case the speed would be reduced only by $\frac{1}{4}$ knot.—*Het Schip*, December, 1926.

The Rotormotorship Barbara

This vessel, which has now been operated successfully for six months, has 2 M. A. N. four stroke motors, each of 550 horsepower, giving her a sea speed of $9\frac{1}{2}$ to 10 knots. She is fitted with three rotors 56 feet high and 13 feet diameter.

In the case of the rotors the ratio $\frac{\text{Power given out}}{\text{Effect produced}} = \frac{1}{10}$.

With an 18-mile per hour wind the horsepower obtained from the rotors amounted to 600. The construction of the rotors is very light, each weighing only 1.6 tons. During heavy storms with a 60-mile an hour wind they have shown no sign of being strained. The rotors can all be controlled by the officers on watch without assistance. In spite of

moderate winds, an average increase in speed of 2 knots has been obtained during 42 percent of the days at sea. With favorable winds the maximum increase in speed is 3.5 knots due to the rotors. Even with winds from aft the rotorship is as effective as a modern sailing ship. Rotors and both motors with an 18-mile per hour wind gives 13 knots speed. Rotors and one motor with an 18-mile per hour wind gives $10-10\frac{1}{2}$ knots speed. Rotors alone with an 18-mile per hour wind gives 6 knots speed. Experience has shown that in a new vessel it would only be necessary to install 2 rotors, the *Barbara* having 3. The conclusion drawn is that the days at sea can be materially reduced by continued combined use of rotors and motors. For a not too expensive installation and fair winds over a great part of the voyage the success of the rotorship is unquestioned.—*Werft-Reederei Hafen*, April 7, 1927.

Resistance of Small Freighters

By T. C. Arkenbout Schokker

The author makes use of Kent's I.N.A. 1919, paper and Baker's I.N.A., 1914, paper to find the resistance of a small coastwise steamer 195 by 29.5 by 13.6 feet, of 1,655 tons displacement and 0.756 prismatic coefficient. Only one

of these models had an $\frac{L}{B} = 6.1$ but unfortunately only

one B/D ratio = 2.8 was given for this model, while a B/D ratio of 2.1 to 2.4 is more common in this type of vessel. The author compares his ship with a similar ship of 400-foot length using Kent's series, in which case he has to interpolate to get the correct B/D ratio. The resistance of the 195-foot vessel is found to be 8,440 pounds.

Interpolating between the results given for the models 97B, 49 and 67A in Baker's I.N.A. 1914, paper the resistance of the 195-foot vessel becomes 9,100 pounds. (Strictly, the resistance is here found for a 197.7-foot by 29.9-foot by 13.3-foot vessel). Similarly the resistance can be found from Temple's I.N.A. 1919, paper, McEntee and Robertson's Society of Naval Architects and Marine Engineers papers in 1919 and 1920 and Schaffran (*Jahrbuch der Schiffbau. Ges.* 1921).

The author then proceeds to do this for a number of ships given by Scott in *The Shipbuilder*, 1922, as follows:

	A	B	C	D
I.	225	195	152	115
B.	33	29.5	24.5	20
d.	14.92	13.6	11.5	9.5
W.	2,367	1,655	903	431
V.	9.96	9.79	9.61	9.50
I.H.P.	758	620	495	422

Author's results—mean values calculated by six methods above mentioned.

Resistance —	A 10,900 lbs.	B 8,200 lbs.	C 6,600 lbs.	D 4,300 lbs.
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These mean values, after an addition of 10 percent, are used for finding the I. H. P.'s from Schaffran's systematic self-propelled model tests. The I.H.P.'s thus found, assuming 80 percent efficiency of engine, are given in the table below, compared with Scott's and the admiralty coefficient method, using a "C" = $10(7 + \sqrt{L})$.

	A	B	C	D
I.H.P. Author's	716	585	425	274
I.H.P. Scott's	758	620	495	422
I.H.P. Admiralty formulae	800	625	430	274

The author feels unable to explain the great differences in case D.

Increasing the length from 195 to 200 and keeping W and v constant, using Schaffran's 1921 paper, the following interesting results were obtained:

B	D	C _b	Resistance
28.75	12.27	0.822	13,200 lbs.
30.27	12.92	0.741	9,200 lbs.
31.85	13.60	0.670	8,300 lbs.

—*Het Schip*, May 27, 1927.

Questions and Answers for Operating Engineers

Practical information for marine engineers on the operation and maintenance of boilers, engines and auxiliaries

This department is maintained to help those who desire practical information regarding engine room problems or who are preparing to take examinations for a marine engineer's license. Readers are urged to send in questions. Inquiries bearing the name and address of the writer will be answered promptly by mail. If the question is of general interest the answer will also be published in an early issue of the magazine, although the identity of the writer will not be disclosed in doing so. Anonymous communications will not be considered.

Duty of Lubricants

Q.—What is the principal duty of lubricants?

A.—The principal duty of all lubricants is to reduce friction between two bodies, one of which is in motion while the other is at rest.

Important Qualities of a Lubricant

Q.—What are the most important qualities that a lubricant should possess?

A.—Body, free from gumming ingredients and all foreign matter. Stability under temperature changes, fluidity and freedom from acidity.

Duties of Engineer When Ship Is Drydocked

Q.—When a ship is placed in dry dock what are the duties of an engineer?

A.—Examine propeller, zinc plates, all strainers on outside of ship, all sea valves and stern tube packing. Examine tail shaft and bearings, if the tail shaft is drawn for inspection.

Temperature Readings

Q.—What can be learned by taking temperature readings?

A.—By taking the temperatures of steam or water in the cylinders, pipes, hot well, condenser, feed pumps, air pumps, etc., or of the gases in the smoke stack, it is possible to get a line on the efficiency of the performance of the main engines and the various auxiliaries.

Starting Air

Q.—How is the starting air obtained and where stored?

A.—By means of an auxiliary air compressor driven by a Diesel engine, electric motor or steam engine. It is stored in large, riveted tanks, usually suspended under the deck in the engine room.

Preparations for Starting a Diesel Engine

Q.—Describe the preparations for starting the engine.

A.—Jack the engine to see that it is clear for running, start lubricating oil pump, and see that oil reaches all bearings, open by-pass valves in fuel oil lines to spray valves and pump oil through by hand to clear out all air and fill the pipes with oil, open stop valves in starting air and spray air lines, give cylinder lubricators a number of turns by hand to get some oil into the cylinders, start jacket

cooling water pump and see that the propellers are clear. If means for heating the cylinders are available and the weather is cold, warming up should be started in time to have all the cylinders hot before starting.

How to Extinguish an Oil Fire

Q.—How would you extinguish an oil fire.

A.—With CO₂ or chemical extinguishers, if available. Small fires may be smothered with sand. Never throw water on an oil fire.

How to Determine if Tail Shaft is Down

Q.—If you thought that the tail shaft had sunk down a little, how could you find out without putting the ship on the dry dock?

A.—This could be determined by removing the bolts in the coupling; if the coupling opened, that would indicate that the shaft was down.

Thrust Bearing Keeps Crank from Rubbing Against Journal Bearing

Q.—What keeps the crank web from rubbing against the journal bearing?

A.—The crank is kept from rubbing against the journal bearing by means of the thrust bearing.

Determining Distance Piston and Shaft Have Worked Down

Q.—How would you find the distance that the piston and shaft had worked down?

A.—This could be found by finding the clearance of the piston or by the builders' marks on the guides.

How to Handle Boiler Feed When Main Feed Pump Fails

Q.—If the feed pump failed to force water into the boilers, what would you do?

A.—I should start the auxiliary feed pump and injector if necessary until the main feed pump was overhauled.

Factors Affecting Strength of Boiler Shell

Q.—What four elements must be taken into consideration to determine the strength of a cylindrical boiler shell to withstand internal pressure?

A.—Tensile strength, thickness of plate, radius of shell and efficiency of the joints.

Why the Temperature of Cooling Water Discharge Should Be Obtained from Each Cylinder Separately

Q.—Why is it desirable to have thermometers so located that separate temperature readings of the cooling water discharge from the cylinders can be taken?

A.—If the temperature of the common discharge from all cylinders is taken, a single cylinder jacket may become air bound and the flow of cooling water through it stopped altogether without giving any indication at the common outlet.

Precaution in Changing Over Auxiliary Exhaust to Main Condenser

Q.—After you have left the dock and all clear, what care should be taken when changing over your auxiliary exhaust to the main condenser?

A.—The valve on the main condenser should be opened the same time as the one on the auxiliary condenser or to the atmospheric exhaust is closed to prevent a loss of vacuum.

How to Start a Diesel Engine

Q.—How are Diesel engines started?

A.—By running as air motors, on compressed air at medium pressure, until ignition of fuel occurs and operation as a combustion motor starts.

Loose Bearings

Q.—Why should the bearings of a new engine be gone over after 800 or 900 hours of running?

A. To take up looseness due to the initial wearing in.

Why Piston May Drag or Stick if Load is Increased

Q.—Why will a piston which runs without trouble at normal load sometimes drag or stick if the load is increased?

A.—Because the clearance in the cylinder may be sufficient at normal load but when overload causes all parts to become hotter the increased temperature of the piston causes it to expand more and reduce the clearance.

Effect of Too Much Or Too Little Clearance Between Cam and Roller

Q.—What is the effect of too much or too little clearance between a cam and its roller?

A.—Too much clearance causes late valve opening, early closure, decreased lift and noisy operation. Too little clearance causes early opening, late closure, increased valve lift and may prevent complete closure.

Troubles with Fuel Measuring Pumps

Q.—What are some of the common troubles experienced with fuel measuring pumps?

A.—Leaky suction and discharge valves, due to grit in the oil or to particles of dirt or lint becoming caught under the valves, pump becoming air bound, incorrect clearance between suction valve stems and tappets, leaky plungers, and change in timing, due to looseness in the operating gear.

Advantages of Vertical Feed Pump

Q.—What are the principal advantages of the vertical over the horizontal feed pump?

A.—The ease with which it may be attached to a bulkhead and the small floor space occupied.

The facility afforded for the examination of the valves in the water end through the removal of a bonnet.

Cleaning Fouled Condenser

Q.—When a condenser has become fouled from sources outside the ship, what steps should be taken in cleaning?

A.—Close the sea connections and secure against accidental opening.

Before opening the system, be sure that the condenser shell will not be subjected to a pressure in excess of about 15 pounds.

Examine the tube sheets and stop any leaks found. No

naked flame should be used in the vicinity because of the possible presence of sewer gas or hydrogen.

Open the water side of the condenser and brush out the tubes. If required, an air lance may be pushed through each tube. Clean the tube sheets and remove all dirt from the water chests.

If the tubes are solidly packed with mud or sand, a water lance may be used. This is made from tubing slightly longer than the condenser tube and connected to the fire and bilge pump.

Air to Burn a Pound of Oil

Q.—How much air is required to burn a pound of oil?

A.—About 15 pounds or 200 cubic feet of air. Less air will mean incomplete combustion. Excess air lowers the evaporation power of the boiler.

Area of Steam Piston in Feed Pump

Q.—Why is the area of the steam piston in a feed pump greater than that of the water plunger?

A.—This is done to give the pressure on the steam side a pronounced excess over the resistance on the water side. This makes possible the overcoming of the resistance in the valves and piping and the forcing of water into the same boiler from which the steam for the operation of the pump originally came.

Lignum-Vitae Stern Tube Bearings

Q.—Why is lignum-vitae commonly used for the stationary part of stern tube and shaft strut bearings?

A.—Lignum-vitae is tough, durable and does not swell when wet. It contains a resin which is said to act as a lubricant when in water. The portion of the stern shaft within the stern tube is covered with a composition water-tight casing for its protection from sea water and to provide a good bearing material on the lignum-vitae.

Clearance in a Bearing

Q.—Upon what factors does the amount of clearance to be given in a bearing depend?

A.—In the assembly of a bearing the butting faces of the brasses when set up must be brought into metal to metal contact. However, sufficient space must be left between bearing metal and journal for lubrication. It is desirable to reduce this clearance to the minimum consistent with the space requirements for good lubrication.

In general the amount of clearance depends upon the size of the bearing, the speed of revolution, the character of the load action, viz.; whether constant in direction as in a rotating unit or alternating in direction as in reciprocating units, and the alinement of the system.

Pointing the Rods

Q.—What is meant by pointing the rods? Please explain fully how this is done.

A.—I have been unable to find a meaning for this expression unless it be to line up the connecting rods in which case the following procedure may be used:

Remove the crank pin brasses, put its crank on the top dead center and with the rod dropped to the crank pin measure the distance on either side of the rod butt end to the crank web. Now with the crank on its lower dead center and the rod lowered to its bottom position, take similar measurements. If the top and bottom measurements are equal the rod is in line.

Questions and Answers Relating to Naval Architecture and Marine Engineering

Conducted by James L. Bates, Naval Architect, and W. B. Newton, Marine Engineer

This department is maintained for the purpose of answering all questions relating to ships and their machinery. All inquiries should bear the name and address of the writer. Anonymous communications will not be considered. The identity of the writer, however, will not be disclosed unless the editor is given permission to do so.

Thermal Efficiency of Diesel Engine

Q.—In your March issue there is an article on the performance of McIntosh-Seymour four-cycle, single acting Diesel engines for the Shipping Board. In their data of a 30-day shop test they have an oil of 21.1 degrees Beaume having a high heat value of 18,788 B.t.u. per pound, a low heat value of 17,706 B.t.u. per pound, and get an average thermal efficiency of 32.14 percent on an average of 0.428 pound of oil per brake horsepower per hour. According to the formula of H. F. P. Purday, I do not get more than 28 or 29 percent thermal efficiency, using oil of 18,000 B.t.u., and 31 percent, using oil of 19,000 B.t.u. per pound. Also an oil containing 19,000 B.t.u. per pound is not being sold for commercial use at economic prices. Perhaps Mr. Purday has the wrong formula, if so, I would be pleased to have some information on it. —J. J. M.

A.—I think the following step by step procedure will make clear the manner in which the thermal efficiency given in the article referred to was found:

Lbs. of fuel per b.h.p. per hr. corrected to 18,500 B.t.u.=0.428.
Corrected total heat supplied by oil per b.h.p.= $18,500 \times 0.428 = 7,918$ B.t.u.

Foot pounds per minute per b.h.p.=33,000.

Foot pounds per B.t.u.=778.

$$= \frac{33,000 \times 60}{778}$$

One horsepower hour= $\frac{33,000 \times 60}{778} = 2,545$ B.t.u.

Thermal efficiency on a basis of 18,500 B.t.u. per pound of
 $\frac{100 \times 2.54}{7,918}$

$$\text{fuel} = \frac{100 \times 2.54}{7,918} = 32.14 \text{ percent.}$$

Now using the Purday formula the thermal efficiency corrected to 18,500 B.t.u. oil, the result will be found to again check with the article—

$$\frac{1,980,000 \times 100}{0.428 \times 18,500 \times 778} = 32.14 \text{ percent.}$$

Slip

Q.—How many kinds of slip are there? Please define them.

A.—The writer is familiar with three kinds of slip, i.e., true, apparent and virtual. The first two are commonly used. The third is referred to by Rear Admiral D. W. Taylor, (C.C.), U.S.N., in "Speed and Power of Ships."

True slip is the ratio between the speed of ship and the speed of the propeller. This is properly called the slip ratio or slip fraction. It is also commonly and conveniently called simply "the slip," and expressed as a percentage instead of a decimal fraction. For example: a propeller works with a slip of 15 percent, when the value of the fraction—

$$\frac{\text{Speed of Propeller} - \text{Speed of Advance}}{\text{Speed of Propeller}} = 0.15$$

In the foregoing, the speed of propeller is its speed relative to that of the wake water in which it works. When slip is calculated with reference to the speed of the vessel instead of the speed through the wake water, it is called the "apparent" slip.

Screw propellers, because of the thickness of blade which

is required in order to provide sufficient strength to resist the thrust pressures, have two varieties of pitch, i.e., that of the face of the blade and that of the back. The face pitch is capable of close measurement; the pitch of the blade back varies greatly from the leading to the trailing edge. The "virtual" pitch is the pitch of an ideal propeller blade having no thickness which would act in the same way as the actual propeller blade acts. The virtual pitch is frequently ignored in practical work with screw propellers and on this account very considerable error is introduced in the conclusions drawn as to the propeller performance.

For further information relative to the above, see "Speed and Power of Ships" by Rear Admiral D. W. Taylor, (C.C.), U. S. N., edition 1910, pages 130, 131, 158 and 159; and "Elements of Yacht Design" by Norman L. Skene, page 218.

Estimating Power of Slow Cargo Vessels

Q.—Please discuss the best method of estimating the power of cargo carrying vessels of low speed and full underbody.

A.—There are several methods suitable for this purpose, each of which brings good results provided it is used with judgment based upon experience with that method.

The first is a method developed by Professor E. M. Bragg and described in Sterling's "Marine Engineers' Handbook." This method furnishes the effective horsepower by means of the formula:

$$D \times V^3 \div C \times \sqrt{L}$$

In this formula D is the displacement, V is the speed in knots, L is the waterline length and C is a constant taken from curves plotted upon the breadth to draft ratio and varying with displacement. The value of C has been obtained from model experiments carried out in the experimental tank at the University of Michigan, based upon forms appropriate to vessels of the slow, cargo carrying type.

The second method is one proposed by J. C. A. Schokker, an abstract of the translation of which is published in the July, 1924, issue of MARINE ENGINEERING AND SHIPPING AGE. This method is based, in general, upon the results of experimental work published by Kent and put in the form followed by Admiral Taylor in his "Speed and Power of Ships." The range of speed-length ratio covered is from 0.5 to 0.7; the values of prismatic coefficient vary from 0.65 to 0.83; and the displacement-length coefficient varies from 90 to 340.

The third method is that described by A. J. C. Robertson in his article upon "Economical Cargo Ships—Some Model Experiments" in the *Transactions* of the Society of Naval Architects and Marine Engineers, 1920. This method makes use of the accepted British system, with certain minor modifications, and is based upon model experiments carried out for cargo vessels of slow and moderate speeds by the experimental tank at Ann Arbor, Michigan, and checked in certain instances by experiments from the Model Basin at Washington.

The fourth method is that developed and described by

Admiral D. W. Taylor in his "Speed and Power of Ships." This last method is based upon models without parallel middle body and applicable primarily to vessels of moderate and high speeds, although within certain limitations it may be used for full-bodied vessels of the cargo carrying type.

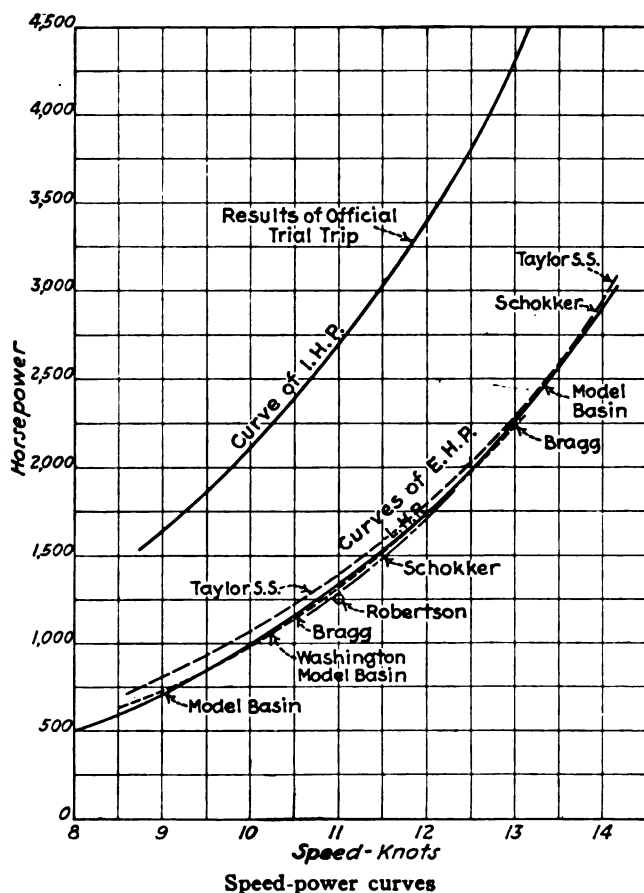
It is the practice of the writer to base his estimates upon the method which has for its foundation underbody forms most closely similar to that of the vessel which it is proposed to power, and to check these results by one or more of the other methods referred to above.

For example, let it be required to find the effective horsepower at a speed of 11 knots, of a ship having the following characteristics:

Displacement	14,500 tons
Length on waterline	455 feet
Beam	56 feet
Draft	26 feet
Mid section coefficient	0.98

These are the particulars of an oil tanker, designed some years ago for a speed of 14 knots, which actually made $14\frac{1}{4}$ knots on trial. This vessel has a straight stem with the ordinary fan-tail or overhanging stern carried well above the water. She has between 30 and 35 percent length of parallel middle body and is, in general, typical of the ordinary vessel of her type except that her center of buoyancy at the designed draft is at the mid perpendicular—not several feet forward thereof, as has been shown to be conducive to driving efficiency.

On the appended sketch are shown the curve of effective horsepower as derived from experiments made in the Wash-



ington Model Basin; the curve of indicated horsepower as taken from the results of the official trial trip; and three curves of effective horsepower as estimated in accordance with Bragg's, Schokker's and Admiral Taylor's methods, respectively.

An examination of the above sketch brings out the fol-

lowing facts: The curves as derived by Bragg's and Schokker's methods agree almost exactly with the Model Basin curve. The curve estimated in accordance with Admiral Taylor's method lies noticeably higher than the Model Basin curve. This discrepancy can probably be accounted for by the fact that Taylor's standard series did not include forms having parallel middle body, and therefore for vessels of large values of prismatic coefficient, for which type parallel middle body is advantageous, the powers derived from this method of estimate would naturally be large.

One spot has been estimated in accordance with Mr. Robertson's data. This spot corresponds to a speed of 11 knots and is noticeably below the curve of effective horsepower as obtained from the Washington Model Basin experiments. It is believed that this may be due to the fact already noted, that the center of buoyancy for the ship under discussion is at the mid perpendicular rather than somewhat forward, as is the case in the models upon which Mr. Robertson's data are based.

At the speed of 11 knots the propulsive coefficients derived from the results as plotted in accordance with each of the above methods are as follows:

Bragg	1320	= 0.489
	2700	
Schokker	1300	= 0.482
	2700	
Robertson	1250	= 0.464
	2700	
Taylor	1400	= 0.518
	2700	
Model Basin	1340	= 0.496
	2700	

Propulsive Coefficient of Cargo Vessels

Q.—What value of propulsive coefficient is realized in practice with slow, very full bodied, cargo vessels?

A.—In the *Transactions* of the Society of Naval Architects and Marine Engineers, 1922, Commander William McEntee (C.C.), U. S. N., in an article on the propulsive efficiency of single screw cargo vessels, writes as follows:

"Summing up the results of both series of experiments, it appears safe to conclude that for a well designed hull with a propeller running at about 90 revolutions per minute, a hull efficiency of 1.09, a propulsive efficiency of 0.65 may be expected in a single screw cargo ship."

In the foregoing, the propulsive efficiency referred to is the ratio of the effective horsepower, bare hull, to the shaft horsepower.

At the time the foregoing article was read, professor Herbert C. Sadler and others did not entirely agree, the feeling being that the values quoted were higher than could be justified by practical results. However, Professor Sadler in commenting upon papers by Professor E. M. Bragg and by Rear Admiral D. W. Taylor (C.C.), U. S. N., in the 1922 *Transactions* of the Society of Naval Architects and Marine Engineers, writes as follows:

"I was surprised to find that the propulsive coefficient had to be something like 65 percent or more in order to get the tank results to agree with practical results. At that time it seemed to me that there must be something wrong somewhere because we hardly expected large capacity freighters to have a coefficient of 65 percent, such as you get in battleships."

"Admiral Taylor's paper gives the answer. You will notice the hull efficiency is considerably over 100 percent and Commander McEntee showed the same thing a year or so ago. In the case of Lake vessels, vessels with 19 feet draft and propellers 14 or 15 feet in diameter, we are reaching out into the top regions of the

wake much more so than in the case of the ocean liner, where the draft is much greater and the propeller no greater in diameter."

In the *Transactions* of the same society, 1923, Professor A. F. Lindblad in his article "Some Factors Affecting the Economy of Operation of the Lake Freighters" writes:

"A propulsive coefficient of 0.6 was assumed, a value which experience seems to indicate is easily reached on these very full vessels; in fact, some of the published results do not agree with the tank results unless a higher propulsive coefficient is assumed. The naval architects on the Great Lakes often figure with a propulsive coefficient of 0.65."

The preceding is based on bare hull effective horsepower and upon the indicated horsepower of the engine.

LETTER TO THE EDITORS

What About Shipyard Workers?

WOODBURY, N. J.

TO THE EDITORS:

From the commencement of the decline of the American shipbuilding industry until the present moment we have been calling public attention to what this will mean to the nation if something is not done to keep at least a few of the larger shipyards in existence.

At the present time no one in America feels this depression in just the same way that the shipyard worker does. To him it is a calamity. It means that he will have to give up the line of work to which he has been trained and seek another means of making a living. To many it means a loss of home, up-rooting of family and moving elsewhere, reduced wages, lowered standard of living and many other domestic problems which if of no great consequence to the nation are of supreme importance to them.

For a number of years I have been in close personal contact with shipyard workers and I know how badly worried these men are becoming, concerning their future. Many have already drifted away never to return while the older and more experienced ones are being retained until the very last moment. Unfortunately for them they have been held by their employers through every previous depression because they constituted a framework upon which a larger organization could be built, but they were prevented from facing the problem of finding another means of making a living, and now it appears that they are going to have to learn to do something else.

They realize that unless something occurs to revive the shipbuilding industry they will shortly be thrown into the labor market to take what they can find, be it good, bad or indifferent. They are afraid that their training is going to be of little use to them when they go hunting a job and some are just a little afraid that their age will count against them. They are unanimous in their condemnation of shipyard work as a means of making a living. They are determined to keep their children out of it. Many of them declare that if they find it possible to make a living in any other way they will never again cast their lot with the uncertain fortune of shipyard work.

As an example of their desperation: Only recently a contract was let abroad, by one of the largest American oil companies, for the construction of a large motor tanker. Earlier rumors had it that this ship was to be built in this country. When news of the change spread many shipyard workers became vindictive.

Throughout the country this oil company has countless gasoline filling stations, so expensively constructed that they bespeak great wealth, so stable in appearance that they impress the motorist with a feeling of security and confidence that a uniformly high quality product must be on

sale there, so conveniently located that it is fully as easy to drive in as to continue along the street or highway. They are, in fact, more difficult to avoid than to patronize.

Several thousand shipyard workers with automobiles have declared a boycott on these filling stations and many of them have written letters to friends and relatives asking that they help by also boycotting this company. In shipyard towns they have asked almost every resident to help.

Of course this will not last. The oil company will not feel the weak effort of the shipyard workers to retaliate and if it did it would not know what it was all about for these men are not radical, they have threatened nothing and they do not believe in throwing bombs. If this boycott is felt, it will be of less consequence to the oil company than the loss of that one contract has been to the entire shipbuilding industry of the country and one ship more or less will not pull us out of the present pinch. It could tide several hundred families over a bad spell for there are many such families in the shipbuilding towns.

The point of importance to this country is that when the shipyard workers find themselves in such desperate straits that they seek every small means, within their power, of getting even with whoever they think in any way responsible for the present state of affairs we may rest assured that these men are ripe to abandon the line of work which they know best. When this occurs the shipyards will be dead for there is perhaps no industry in the world which is more dependent upon the skill and training of its employees than are the shipyards. The men can and will survive without this line of work but the fact remains that whereas they are the greatest losers just now the shipyards will be doomed to sustain an even greater loss in the future.

Unfortunately many of the men blame their employers, while the employers are not at fault. This condition is creating a state of misunderstanding which it is going to be difficult to repair.

In a few notable cases the men have been likened to rats that desert a sinking ship but after all can we blame the rat?

A. B. NEWELL.

NEW BOOKS

OIL TANKERS. By Robert W. Morrell. Size, 4½ by 7½ inches. Pages, 284, including index. Illustrations, 43. New York and London, 1927: Simmons-Boardman Publishing Company.

This book is an attempt, on the part of a naval architect and engineer, a large part of whose professional life has been devoted to the construction and operation of oil tank vessels, to place his experience in a form to be of practical assistance and value to others who have to do with or are interested in this class of vessel.

That Mr. Morrell's attempt has proved a highly successful one is amply proved by the cordial reception which has been accorded it and the widely spread demands for copies of the book which came to hand before it was even in the printer's hands.

When it is remembered that the world's largest fleet of commercial tank vessels is that under the American flag, it having, in fact, a total gross tonnage of something over 2,400,000, the very large number of people in this country who are directly or indirectly interested in tanker building or operation may be realized.

The tanker is a very special kind of ship. In addition to meeting the requirements common to all vessels she has to render her own peculiar service, a thorough knowledge of which can come only from long and extended practical experience.

It is to the treatment of these special and peculiar characteristics that Mr. Morrell has particularly applied himself and the amount of practical information and common sense advice which he has succeeded in compressing into a small and handy book is remarkable.

The extended scope of the book is indicated by the following list of chapters with the subjects treated in each one:

- | | |
|----------------------------|------------------------|
| I—Requirements. | IX—Freeboard. |
| II—Economical Speed. | X—Fire Prevention. |
| III—Propelling Machinery. | XI—Fire Protection. |
| IV—Structural Arrangement. | XII—Repairs. |
| V—Structural Design. | XIII—Cargo Oil Piping. |
| VI—Structural Notes. | XIV—Operation. |
| VII—Structural Members. | XV—Oil Tank Barges. |
| VIII—Tonnage Measurement. | |

DREDGING AND DREDGING APPLIANCES. By P. M. Dekker. (English edition.) Size, 7½ by 10½ inches. Pages, 170. Illustrations, 137 with an appendix comprising 7 supplements. London, 1927: Crosby Lockwood & Son.

The introduction to this book commences with the following statement: "The sole aim of this work is to give an account of the development of dredging appliances in Holland." From this the conclusion might be drawn that the book is primarily of local interest. To some extent this may be the case, but as dredges are confronted in all parts of the world with work similar to that which they have to perform in Holland, an account of the Dutch development in this line of engineering cannot fail to be of interest to dredging engineers everywhere.

The Dutch have long been celebrated for their dredges. The geographical situation of Holland is such that dredging is a very essential part of the country's development and maintenance and, in consequence, dredges have thus been developed to the highest degree of efficiency.

Mr. Dekker's work opens with a historical sketch of the development of dredging in his country and then goes on to a detailed description of the present day dredge. In Holland, the dredges are principally of the ladder and the suction types. The first part of the work, comprising 84 pages, is devoted to ladder and bucket dredges and the second, also of 84 pages, to suction dredges of various types, hopper dredges and barges. All of the different types, and many of their details, are copiously illustrated by photographs and plans and some excellent folded plans of the general arrangements of a number of typical vessels are appended. The typographical work and the illustrations are both of the highest class.

Books of General Interest

THE SHIP UNDER SAIL. By E. Keble Chatterton. Size, 6¼ by 8¼ inches. Pages, 224. Illustrations, 36. Philadelphia, 1927: J. B. Lippincott Company.

THE BRIDGE TO FRANCE (the inside story of the war-time Shipping Board). By Edward N. Hurley, war-time chairman of the United States Shipping Board. Size, 5½ by 8¾ inches. Pages, 338. Illustrations, 25. Philadelphia and London, England, 1927: J. B. Lippincott Company.

THE PANAMA CANAL (its history, activities and organization). By Darrell Hevenor Smith. Size, 5½ by 8¼ inches. Pages, 413. Baltimore, 1927: The Johns Hopkins Press.

BENJAMIN GARVER LAMME (an autobiography of the late chief engineer of the Westinghouse Electric & Manufacturing Company). Size, 5½ by 8½ inches. Pages, 271. Numerous illustrations. New York and London, England, 1926: G. P. Putnam's Sons.

THE WHALE SHIP BOOK. By Joseph T. Higgins. Size, 9 by 11½ inches. Pages, 36. Numerous illustrations. New York, 1927: The Rudder Publishing Company.

This book describes the distinguishing details of old-time whale ships and gives a complete description of a typical whaler and working plans of the famous *Alice Mandell*.

PERSONAL MENTION

E. F. HEARD has been appointed hull superintendent of the Newport News Shipbuilding and Dry Dock Company.

L. J. IRON has been appointed assistant naval architect of the Manitowoc Shipbuilding Corporation, Manitowoc, Wis.

E. J. CORNBROOKS has resigned as sales manager of the Newport News Shipbuilding and Dry Dock Company, Newport News, Va.

J. M. HANDLEY has been appointed chief engineer of the steamship *Sudbury* operated by the American Ship and Commerce Navigation Corporation of New York.

JAMES SHORT, who has been port engineer of the Oil Transport Company, Inc., of Baltimore, Md., has been appointed on the staff of Lloyd's as surveyor at the port of New York.

C. H. ANDERSON, **H. T. BENT** and **J. C. STERLING** have been appointed assistant hull superintendents of the Newport News Shipbuilding and Dry Dock Company, Newport News, Va.

A. F. SIDEBOTHAM, manager of the Baltimore offices of Furness, Withy and Company, has been appointed Pacific coast manager of the firm, with headquarters in San Francisco, succeeding T. A. Lee, resigned.

CAPTAIN O. W. HUGHES has been appointed marine superintendent for the Gulf District of the Transmarine Company, with headquarters in either Mobile or New Orleans, the location to be decided later.

T. A. LEE, Pacific coast manager for Furness, Withy and Company for the last seven years and well known in Seattle, has retired. Mr. Lee will leave the business world entirely and take up permanent residence in Scotland.

RICHARD P. WORTHINGTON, who has been first assistant engineer of the steamship *West Farallon* operated by the United States Shipping Board, has been promoted to the position of chief engineer on the steamship *West Sequana*.

CAPTAIN FRANK T. CHAMBERS, Public Works Officer, 14th Naval District and Navy Yard, Pearl Harbor, Hawaii, was recommended by President Coolidge on May 3 for promotion to the rank of rear admiral. Admiral Chambers was born in Louisville, Ky., July 1, 1870. He graduated from the Rensselaer Polytechnic Institute, Troy, N. Y., in 1892 and following five years' engineering work in civil life he was appointed a civil engineer in the Navy in July, 1897. His first duty was at the New York Navy Yard, following which he was detailed to Samoa on the construction of a coaling station. He returned to the States in February, 1901, and served successively in engineering capacities at the Navy Yard, Philadelphia, Bureau of Yards and Docks, Navy Department; and on an investigation for a coaling station at Kiska Harbor, Alaska. In January, 1906, he was detailed to the Department of Justice to assist on cases pending in the Court of Claims. From 1907 to 1909 he served as principal assistant to the Chief of Bureau of Yards and Docks in Washington. From 1910 to 1915 he was successively on duty at the Navy Yard, Mare Island, Calif.; Navy Yard, Norfolk, Va.; Training Station, Great Lakes, Ill.; and Navy Yard, Charleston, S. C. In January, 1916, he was again detailed to duty in the Bureau of Yards and Docks, where he served until July, 1917, at which time he was ordered to the Naval Operating Base, Hampton Roads, Va., on the construction of that base. In January, 1918, he was detailed to duty

with the United States Shipping Board. He first served in the Division of Shipyard Plants, and was later made chief engineer of the Port Facilities Commission. In the summer of 1918 he was sent abroad by the Shipping Board to study port facilities with a view to a quicker turnaround of United States ships. The report prepared by him was printed as a Shipping Board document and has had wide distribution. In January, 1925, he was appointed consulting engineer on Port Facilities to the Board of Engineers for Rivers and Harbors of the War Department. In this capacity he advised on port development on all coasts of the United States and also on inland and river terminals. In April, 1926, he was detached from duty with the War Department and assigned as Public Works Officer of the 14th Naval District and the Navy Yard, Pearl Harbor, T. H.

WALTER E. THAU, manager of marine engineering, general engineering department, Westinghouse Electric and Manufacturing Company, whose appointment as director of marine engineering of the Westinghouse Company with headquarters in New York City was announced in the June issue of

MARINE ENGINEERING AND SHIPPING AGE, will in his new work coordinate all of the Westinghouse Company's engineering affecting the marine field and maintain engineering contact and service to the marine industry as a whole. Mr. Thau was born in Cincinnati, Ohio, in 1887. He received his preliminary education at Norwood High School and was graduated from the University of Cincinnati with the degree of bachelor of science in electrical engineering. In 1911, he entered the employ of the Westinghouse Electric Company as an apprentice. In 1912, he was given a position in the company's engineering department and from that time until 1915 he was engaged in the application of electrical equipment to main roll drives and auxiliaries in steel mills. In 1915, Mr. Thau began work on equipment for the marine field and has been engaged in this activity ever since. In the application of electrical equipment to naval and merchant vessels, including propulsion and auxiliaries, his work has been largely of a pioneering nature. He has assisted in designing the electrical propelling equipment for the U. S. battleships *Tennessee*, *Colorado*, *Washington*, *Indiana*, *South Dakota*, *North Carolina* and *Montana* and the battle cruisers *Ranger* and *Constellation*. He has also assisted in designing and installing Diesel-electric drives in United States War Department dredges and in various merchant ships and yachts and electrical equipment for practical gyroscopic stabilizers. He had a prominent part in the design of submarine propulsion equipment and assisted in miscellaneous War Department and other government activities. In September, 1926, Mr. Thau was made manager of marine engineering, general engineering department, Westinghouse Company, which position he held until his present appointment. In his marine work, Mr. Thau has visited Canada, France, Germany, England and Cuba. He has frequently appeared before various marine organizations, technical societies and universities as a speaker and his addresses have attracted widespread interest in marine, naval and governmental circles and have been widely published. Mr. Thau is a member of the American Institute



Walter E. Thau

of Electrical Engineers, the Society of Naval Engineers, the Society of Naval Architects and Marine Engineers and the propeller Club.

CAPTAIN ANDREW MARTIN was recently appointed assistant surveyor for the Board of Marine Underwriters of San Francisco, Cal. Captain Martin was at one time port superintendent of the Pacific Mail Company at San Francisco.

CLARENCE BODMER, formerly first assistant engineer of the steamship *Maunalei*, Matson Navigation Company, has been transferred to the steamship *Lurline*, also operated by the Matson Navigation Company, as first assistant engineer.

C. A. DAVIDSON, chief engineer of the steamship *Prusa*, operated by the United States Shipping Board, has been made marine representative in Texas for the A. K. Miller Engineering Company. This firm maintains offices and a warehouse in Houston, Texas.

CAPTAIN H. G. GREGG, operating manager of the Export Steamship Corporation, 25 Broadway, New York, is being transferred to Alexandria, Egypt, to take charge of the business of the line in Egypt and the Palestine Coast. The office will open on September 1.

CAPTAIN WILLIAM J. McKEON has retired as marine superintendent of the Atlantic Refining Company, Philadelphia, Pa., after 34 years of continuous service. After a trip to Europe this summer, Captain McKeon will engage in another line of marine activity.

J. TAURNE, former assistant port engineer for Lykes Bros. Steamship Company, New Orleans, La., resigned this position to become port engineer with the Dunbar Molasses Company, New Orleans, La. He is succeeded as assistant port engineer for Lykes Bros. by A. Rosamond, formerly chief engineer of the steamship *Effra*.

PAUL CHANDLER, formerly district manager for the Luckenbach Steamship Company at Seattle, has been appointed manager of the Marine Exchange of the Los Angeles Chamber of Commerce, effective July 1, succeeding Major Cecil A. James, who becomes assistant manager of the foreign trade department of the chamber.

C. C. CHESNEY, manager of the Pittsfield Works of the General Electric Company, W. R. Borroughs, assistant manager of the Incandescent Lamp Department, and C. E. Eveleth, manager of the Schenectady Works, have been made vice presidents of the General Electric Company, according to an announcement recently made by Gerard Swope, president of this company.

JAMES A. WILSON, formerly director of operations of the Merchant Fleet Corporation and lately in charge of the laid-up fleet, has resigned, effective June 30. The name of his successor has not yet been announced and it is possible that the duties of the position may be consolidated with some other department in accordance with the new policy of reducing expenses wherever possible.

E. W. RICE, JR., honorary chairman (ex-officio), C. W. Allen, chairman, Elihu Thompson, A. C. Davis, W. R. Whitney, W. L. R. Emmet, C. C. Chesney and C. E. Eveleth have been appointed as members of an engineering council of the General Electric Company, Schenectady, N. Y., in conformity with a recent action of the board of directors. The duties of this council are to advise with the vice president in charge of engineering on the various problems that arise in connection with engineering and scientific work.

JAMES R. FITZPATRICK has been made vice-president of the Haskellite Manufacturing Corporation. Mr. Fitzpatrick continues as secretary and member of the board of directors. He also continues in charge of sales. He has been with the Haskellite Manufacturing Corporation since a few months following its organization in 1917, and has served it in all capacities from factory manager to purchasing agent and sales manager and also as an executive.

ERIC H. EWERTZ, who recently resigned his position as general manager of the Moore Plant of the Bethlehem Steel Corporation and who for many years has been prominently



Eric H. Ewertz

identified with the development of various shipbuilding and engineering concerns in this country, has opened a consulting engineering office at 50 Church Street, New York. Among the companies with which Mr. Ewertz has held responsible positions during the past 30 years are the Victor Metals Company, the Fore River Shipbuilding Company, the Bethlehem Shipbuilding Company, the Bethlehem Steel Company and the Electric Boat Company. During the war he was manager of the great Bethlehem destroyer building plant at Squantum, Mass. For a number of years Mr. Ewertz has been deeply interested in the development of welding and its many and varied applications in manufacturing, general engineering and structural work. He was one of the founders and is a past president of the American Welding Society and in his new work will specialize on the applications of welding to industrial and manufacturing processes.

HARRY C. COLEMAN, marine engineer of the general engineering department, Westinghouse Electric & Manufacturing Company, has recently been promoted to manager of marine engineering, filling the vacancy created by the appointment of Walter E. Thau as director of marine engineering with headquarters in New York City. Mr. Coleman was born in Ashtabula, Ohio, in 1893, and is a graduate of Ohio State University. He entered the employ of the Westinghouse Company upon graduation in 1916 and has been assigned to marine work, specializing in submarine installations, ship stabilizers, Diesel and turbine electric propulsion and dredges. Mr. Coleman is a member of the Society of Naval Architects and Marine Engineers, and an associate member of the American Institute of Electrical Engineers.

OBITUARY

JOHN MILTON GOODELL, a former editor of the *Engineering Record*, died at New York on June 21, aged 59. During the war he was employment manager for the Emerson Fleet Corporation first for the production division and later for the entire organization.

GEORGE CLARKE, who retired three years ago on his 80th birthday as manager of the Kensington shipyard of the William Cramp and Sons Ship and Engine Building Com-

pany, Philadelphia, Pa., died on Friday, June 3. Mr. Clarke was born in Scotland and learned the shipbuilding industry in Glasgow.

JOHN H. MACALPINE, consulting marine engineer, recently died at his home in Mt. Vernon, New York, in his 60th year. Mr. Macalpine was born in Paisley, Scotland, and was educated at the University of Glasgow. The greater part of his life was spent in Great Britain in connection with ship construction and marine engineering and at various times he was employed by many of the largest steamship lines in the world in various capacities. He was also employed for some time by the United States Navy Department. Mr. Macalpine was associated with the late Admiral Melville in the invention of the floating frame type of speed reduction gears for steam turbines. He will long be remembered as the author of a number of valuable papers on steam turbine construction and design as well as on other marine engineering subjects.

BRIGADIER GENERAL GUY E. TRIPP, chairman of the board of directors, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., died on June 14 in



Guy E. Tripp

the New York Hospital, New York. During his active career General Tripp was associated with the Eastern Railway Company; the Thompson-Houston Electric Company of Boston; Stone and Webster Engineering Corporation, of which he was vice president; chairman of the joint committee on reorganization of the Metropolitan Street Railway Company of New York and finally, when his work with this company was completed, he was

selected for the position of chairman of the board of directors of the Westinghouse Electric & Manufacturing Company on February 10, 1912, in which capacity he continued until his death. During the war, General Tripp was selected as chief of the production division of the Ordnance Department, U. S. A. He was a director in many of the most prominent companies connected with the electrical industry in this country as well as several organizations of international scope.

CAPTAIN HENRY MURRAY SEELEY, supervising inspector of the second district of the United States Steamboat Inspection Service, died at the age of 69 on May 28. He was born in Yarmouth, Nova Scotia, December 2, 1857. He first went to sea in the year 1866 and followed this calling until 1893. At the age of 20 he was made master. In 1895 he was appointed assistant inspector of hulls, United States Steamboat Inspection Service at New York, being transferred in 1900 to Boston, Mass., where he became local inspector of hulls at that port. His work as supervising inspector of the second district began in 1911 with his appointment to the position by President Taft. His headquarters from that time until his death were at New York. During his career with the United States Steamboat Inspection Service, Captain Seeley became prominent in maritime circles and will always be remembered by shipowners, operators and officers of the merchant marine with whom he came in contact for the loyal and efficient conduct of his office.

The Month's Shipping and Shipbuilding News in Brief

Shipyard, Steamship and Port Activities and Other Notes of Interest in All Branches of the Marine Industries

Bids Asked for Turbo-Electric Propelling Machinery for Two Coast Guard Cutters

SEALED proposals will be received by the United States Coast Guard, Washington, D. C., in quadruplicate until 2:00 P. M., July 1, 1927, and then publicly opened, for two turbo-electric ship propulsion sets, and other electrical and miscellaneous equipment for Coast Guard cutters Nos. 48 and 49.

The turbo-electric propulsion sets for cutters Nos. 48 and 49 will each consist of one main and two auxiliary generator sets. The main generator set will consist of a main steam turbine developing approximately 3,500 horsepower at 3,600 revolutions per minute. Steam will be supplied to the turbine at 250 pounds per square inch and 250 degrees superheat. The main turbine will be direct connected to an alternating current generator having an output of approximately 2,600 kilowatts at 2,300 volts and 3,600 revolutions per minute. This generator furnishes current for steam auxiliary purposes and for a synchronous propelling motor of 3,000 shaft horsepower operating at 163.5 revolutions per minute.

The auxiliary generating sets to be supplied are of the three-unit type each consisting of a steam turbine, a direct current generator and an alternating current machine. The turbine driving the auxiliary generator will be a multi-stage machine, designed to operate at 250 pounds per square inch pressure and 250 degrees superheat. The generators driven by this machine will have a combined output of 200 kilowatts.

The following equipment is also described in the specifications used by the Coast Guard for each ship:

- 1—Propulsion control panel.
- 1—Propulsion control equipment.
- 1—Thrust bearing and shaft.
- 1—Transformer, 200 K. W. 2300/230 volts.
- 1—Ventilation set for main motor.
- 1—Cooler, lubricating oil.
- 1—Pump, lubricating oil.
- 1—Switchboard, with panels for auxiliary generators, power distribution and lighting distribution.

SPARE PARTS AS LISTED

Motors, direct current, 230 volts, with powers and speeds as follows:

- 1—Fire pump—30 horsepower—1,800 revolutions per minute.
- 1—Sanitary pump—5 horsepower—1,800 revolutions per minute.
- 1—Refrigeration—5 horsepower—1,200 revolutions per minute.

Motors, alternating current, 230 volts with powers and speeds as follows:

- 1—Circulating pump, main—20 horsepower—600 revolutions per minute.
- 1—Circulating pump, auxiliary—5 horsepower—1,800 revolutions per minute.
- 1—Forced draft blower—15 horsepower—1,800 revolutions per minute.
- 1—Condensate pump—3 horsepower—1,800 revolutions per minute.
- 1—General service pump—5 horsepower—1,800 revolutions per minute.

Atlantic Coast Shipyards Estimating on Two Passenger and Freight Ships

IT is rumored that certain Atlantic Coast shipyards are preparing estimates for the construction of two combined passenger and freight ships. The details of the vessels are not available for publication at this time, but it is understood that they will have a length of about 370 feet, and will be powered with Diesel engines.

From information that could be obtained about these ships, it is assumed they will be used for coastwise service when built. The Grace Line has been interested in ships of this general character recently, and it is possible that the estimates in question are being made for this company.

It is hoped that further specific information will be available shortly when it will be published in these columns.

Plans to Be Prepared for Conditioning Two Nelson Line Vessels

THE United States Shipping Board has sold the two steamships *Sacramento* and *Sutherland* to the Charles Nelson Company, San Francisco, California. The vessels are sister ships and have a net tonnage of 3,596. They are 380 feet long, 53.2 feet beam and depth 27 feet. The company paid \$104,000 for the *Sacramento* and \$107,000 for the *Sutherland*. Both vessels were built at Seattle in 1918.

T. A. McQuilling of the New York Marine Engineering Company, 116 Broad street, New York, will prepare plans and specifications and handle the reconditioning of the two steamships.

Plans for Two 600-Foot Passenger Ships Being Prepared

IT is understood that plans and specifications are now being prepared for two 600-foot passenger and cargo steamships for the Panama Pacific Line of the International Mercantile Marine Company, New York. In general, these vessels will be sister ships of the *California*, now under construction at the yards of the Newport News Shipbuilding and Drydock Company, Newport News, Virginia, for this service.

- 1—Fuel oil pump—5 horsepower—1,200 revolutions per minute.
- 1—Air compressor—3 horsepower—900 revolutions per minute.
- 1—Sterling gear—15 horsepower—900 revolutions per minute.
- 1—Anchor windlass—30 horsepower—900 revolutions per minute.
- 1—Capstan—30 horsepower—900 revolutions per minute.

Federal Shipbuilding Company Preparing Plans for Fast Ship for Isthmian S. S. Co.

FOR some time past the Isthmian Steamship Company, New York, has been planning to build new tonnage. It is understood on good authority that the Federal Shipbuilding Company, Kearny, New Jersey, is now preparing plans and specifications covering the construction of one fast freight ship. This work is still in the preliminary stage and several different types are being considered. When final details are decided upon, complete information will appear in these columns.

The vessel will undoubtedly be driven by Diesel engines. At one time during the development of designs for the Isthmian Company, Diesel-electric drive was considered. The ship in this case was to have been 480 feet in length and of about 12,000 tons deadweight capacity, with a speed of 12 or 13 knots. One innovation proposed was the use of a Diesel generator and storage battery system floating in the line with suitable relays, so that surplus energy might be stored in the batteries at times of low load on the auxiliary machinery which would be available for short periods of peak load. A system of this character would make possible a considerable reduction in the size and power of the generating sets, which would otherwise have to be of sufficient capacity to carry peak loads when required. Whether or not this system will be incorporated in the new vessel cannot be ascertained at this time.

It is probable that a decision will be reached within the near future and that the vessel will in general follow the original plan as to size and power mentioned above.

Inland Waterways Corp. Postpones Date for River Towboat Bids

THE date for the receipt of bids for the construction of an additional towboat for the upper Mississippi river service of the Inland Waterways Corporation, Washington, D. C., formerly asked for, has been postponed from June 15 to July 8. The towboat is to be similar to the three now being constructed for the Inland Waterways by the Dubuque Boat and Boiler Works, Dubuque, Iowa.

The boat will have a length on deck 132 feet; length overall 159 feet 4½ inches; beam, molded, 35 feet; beam overall 35 feet 1¼ inches; depth, molded, 5 feet; crown of deck 6 inches. It will be of steel construction, with watertube boilers, equipped with oil burners. The engines are to be of the Nordberg type or equal, of approximately 600 indicated horsepower.

Bids for the Conversion of the Vessel Chestnut Hill Were Opened June 27

PLANS and specifications have been issued by Angelo Conti, naval architect, 11 Broadway, New York, and bids covering the conversion of the tanker *Chestnut Hill* to Diesel drive were scheduled to be received June 20, but due to the lack of time allowed to shipyards to submit estimates, the final date for the receipt of bids was changed to June 27.

The *Chestnut Hill*, which was purchased some time ago by the Anglo-Chilean Consolidated Nitrate Corporation, New York, from the United States Shipping Board, has a length of 364.9 feet, a beam of 51 feet and a depth of 29.5 feet, with a capacity of 7,000 deadweight tons. She was built in 1918 by the Pusey and Jones Company, at Gloucester, New Jersey.

In order to obtain the earliest possible delivery of the converted vessel, the Anglo-Chilean Corporation purchased one 1,800-horsepower McIntosh and Seymour Diesel engine, and the hull conversion, engine foundation, tank arrangement and the like are being made to suit conditions imposed by this machinery. The engine is of six-cylinder, four-cycle type, having cylinder diameters of 29 inches and a stroke of 48 inches. Two three-cylinder, four-cycle McIntosh and Seymour auxiliary Diesel engines will also be installed. These engines have cylinder diameters of 13 inches with a stroke of 18 inches.

When converted, the *Chestnut Hill* will be placed in service carrying oil between San Pedro, California, and Tocopilla, Chile, to supply the 10,000-horsepower M. A. N. four-cycle Diesel engine plant of the Anglo-Chilean Corporation at that point with fuel.

Crandall Engineering Company Receives Contracts for Two Drydocks

THE Crandall Engineering Company, consulting and constructing engineers, 102 Border street, East Boston, Mass., has received contracts for two small railway drydocks, one of 150 tons capacity for the R. T. Symonette Shipyards, Nassau, B. W. I., and one of 250 tons capacity for the Delaware Bay Shipbuilding Company, Leesburg, New Jersey.

Dravo Company to Build Deck Scows

A CONTRACT for the construction of two steel deck scows, bids for which were received by the United States Engineer Office, Philadelphia, Pa., on May 25, has been awarded to the Dravo Contracting Company, Pittsburgh, Pa., at a price of \$25,775 per scow and a time of 130 days. The scows are to have a molded length 102 feet; width, molded, 30 feet; depth at side, molded, 10 feet, and depth at center, molded, 10 feet 4 inches.

American Bridge Co. Awarded Contract for 13 Steel Barges

A CONTRACT for the construction of 13 steel barges has been awarded to the American Bridge Company, Ambridge, Pa., by the Mississippi River Commission, First and Second Districts, Memphis, Tenn. Bids for the work were received at Memphis on May 14.

Newport News Yard to Build Passenger Steamer for Chesapeake Steamship Company

THE Chesapeake Steamship Company of Baltimore City, Baltimore, Maryland, has awarded a contract to the Newport News Shipbuilding and Drydock Company, Newport News, Virginia, for the construction of a steamer to replace the *City of Annapolis*, which was rammed and sunk by her sister ship, the *City of Richmond*, on February 24.

The new vessel will in general follow the design of the *City of Annapolis*, but certain refinements which have been developed since the time of her construction will be incorporated. Bids for the work were received and opened at Baltimore on Wednesday, June 1. Approximately \$1,000,000 is involved in the contract.

Atlantic Refining May Build Three Additional Tankers Abroad

INFORMATION has been received that the Atlantic Refining Company, Philadelphia, Pa., is contemplating the construction of three additional Diesel-electric tankers in foreign yards. No details of these ships are available at this time, but it is believed that they will follow the same general characteristics as the last tanker order placed with Scott Shipbuilding and Engineering Company, Greenock, Scotland, by the Atlantic Refining. This tanker was of 12,500 tons deadweight, fitted with Diesel-electric propelling units and engines of the Carels-Ingersoll Rand type, now being built by Carels in Belgium. The electric machinery for this order was built by the British Thomson-Houston Company, Ltd., of Rugby, England.

Contract Finally Signed for Construction of Governor's Island Ferryboat

A CONTRACT for the construction of a double-ended steel ferryboat for the War Department, Washington, D. C., has been awarded to the Spear Engineers Corporation, Norfolk, Va., at a price of \$207,000, bids for which were received at Washington on May 2. The new boat is for service in New York harbor, Governors Island, and is to be the *General Charles F. Humphrey* in honor of a former Quartermaster General, recently deceased. The new ferryboat will be equipped with a Bessemer six-cylinder, 420-horsepower Diesel engine.

Contracts Placed by Inland Waterways Corp. for 45 Barges

MAJOR GENERAL T. O. ASHBURN of the Inland Waterways Corporation, Washington, D. C., has awarded the following contracts for the construction of new barges for use on the upper Mississippi river: 20 barges to the Midland Barge Company, Midland, Pa.; 15 to the American Brown Boveri Electric Corporation, Camden, New Jersey, and 10 to the Dravo Contracting Company, Pittsburgh, Pa. Bids for the work were received and opened at Washington on May 16.

Contract for Reconditioning Former Hospital Ship Comfort Awarded to Todd Drydocks, Inc.

A CONTRACT has been awarded to Todd Drydocks, Inc., Seattle, Washington, for the reconditioning of the steamship *Comfort*, formerly the Ward liner *Havana*. This vessel, which had been used as a hospital ship, was recently purchased by the Atlantic, Gulf and West Indies Steamship Lines, on the west coast where the vessel had been laid up for some time. Plans and specifications for the reconditioning were prepared by Theodore E. Ferris, naval architect, 30 Church street, New York. It is understood that the *Comfort* will be used in the Mallory, Ward and Porto Rico Line service as a spare ship.

The vessel has a length of 413 feet, beam of 50.2 feet, depth of 30.9 feet and is of 6,391 tons. The *Comfort* was built by William Cramp and Sons Ship and Engine Building Company, Philadelphia, Pa., in 1907. Power is supplied by two three-cylinder triple expansion engines, having cylinder diameters of 32 inches, 52 inches, 86 inches and a stroke of 48 inches, developing 8,500 indicated horsepower. Steam was originally supplied at 163 pounds per square inch by eight Scotch boilers. The ship is driven by twin screws.

The reconditioning work will include the installation of six new watertube boilers, purchased from the government, which had been placed on the foundations but never connected up. The propelling machinery and auxiliaries in general will be overhauled, although the machinery is in excellent condition. The entire passenger accommodations, including staterooms and public spaces, will be completely rebuilt in order to make the ship adaptable to the various requirements of each of the three lines in whose service she will be used. New electric winches will be installed in the 'tween deck spaces for cargo handling. It is estimated that the reconditioning will amount to about \$850,000 and the work will be completed according to contract in 165 days.

Destruction by Fire of Boston Floating Hospital Necessitates Fitting Out of New Vessel

THE Boston Floating Hospital was recently destroyed by fire as it lay moored to the southerly pier at North End Park. In addition a large section of the pier was destroyed and the flames jumped across the water beyond the pier and damaged about 150 feet of the shed and flooring of Fiske Wharf. G. Loring Briggs, manager of the hospital, estimated the loss on the boat and fittings at \$150,000, with an additional \$50,000, representing the cost of the new boilers recently installed.

The vessel, which had four decks, was launched at the Atlantic Works, East Boston, Mass., in 1906. She was 171 feet long, with a beam of 44 feet and cost \$100,000.

The executive committee of the Board of Trustees of the Boston Floating Hospital unanimously voted to take immediate steps to provide emergency equipment to carry on the work this summer until permanent facilities can be provided. A coast-wise search for a vessel to continue this service has been started. Plans are also being formulated for obtaining approximately \$200,000 to outfit a new ship for the season of 1928.

To Ask Bids for Construction of Large Diesel Yacht

PLANS and specifications have been issued by Henry J. Gielow, Inc., naval architects, 25 West 43rd street, New York, for the construction of a large Diesel yacht. Although particulars of this vessel are not available at present, it is believed that the yacht will be in the neighborhood of 260 feet long.

Wm. E. Woodall Co. to Build Two Covered Lighters

A CONTRACT for the construction of two covered lighters for harbor service of the American Sugar Refining Company, New York, has been awarded to the William E. Woodall and Company, Baltimore, Maryland. The lighters are each to be 80 feet long, 24 feet beam and 7 feet 6 inches depth. The price involved was not made public.

Bids Asked for Six Maneuver Boat Hulls and Derricks

SEALED proposals will be received by the United States Engineer Office, War Department, Louisville, Ky., until 2:00 P. M., central time, July 11, 1927, and then publicly opened, for furnishing all labor and materials and constructing and delivering six maneuver boat hulls and derricks. Further information may be obtained on application.

Canadian Yards to Build Three Ships for West Indies Service

FOUR Canadian shipyards submitted tenders to the Canadian National Railway in Montreal on June 15 for the construction of five ships required for the West Indies service. It is understood that three ships will be built in Canadian yards, while two will be constructed in the United Kingdom. The Canadian bids were received from the Vickers Company, Montreal; Halifax Shipyards, Ltd., Halifax, Nova Scotia; Vancouver Shipyards and a company at Prince Rupert.

The new ships will be of 5,000 or 6,000 gross tons each and will be capable of maintaining a speed of 14 knots. Further details will be available shortly.

Todd Drydocks, Inc., to Repair French Freighter *Arkansas*

WITH a price of approximately \$100,000, the Todd Drydocks, Inc., Harbor Island, Seattle, Washington, was successful bidder for repairs to the French freighter *Arkansas*, which was badly damaged as the result of a collision with the American freighter *Suremico* in a heavy fog five miles off Tatoosh Island recently. The contract was awarded to the Seattle plant in a cablegram from the head offices in Paris of the Compagnie Generale Transatlantique, owner of the vessel.

About 40 plates will have to be renewed entirely or taken out of the ship, faired and returned, before the *Arkansas* is ready for sea again. The work will require about three weeks.

The *Suremico*, which has a crumpled bow and many damaged plates, will also be repaired at the Todd plant, at a price of approximately \$92,000.

Fuel Conservation Committee to Recommend Pulverized Coal Installation on Shipping Board Steamer

AS a result of highly successful tests of Peabody pulverized coal burners, carried out on a Scotch boiler at the League Island Navy Yard, Philadelphia, Pa., by the Fuel Conservation Committee of the United States Shipping Board, in conjunction with the Bureau of Mines, on June 1, the Fuel Conservation Committee will shortly submit to the Shipping Board plans, specifications and estimates for the installation of pulverized coal burners on one of the Shipping Board cargo vessels. This first installation, if authorized, will give an opportunity for experimental work under seagoing conditions for this type of fuel.

Thirty Day Test Commenced on Last of S. B. Diesel Engines—Installation Bids Soon to Be Asked

A 30-DAY test was commenced June 11 on the 3,000-horsepower Diesel engine being built by the New London Ship and Engine Company, Groton, Conn. for use in the United States Shipping Board Diesel conversion program. This is the final engine now on order to be built for installation in a Shipping Board vessel, although a new program of 12 ships is under consideration by the board.

The present engine is to be installed in the *Willcox*. Plans and specifications for this work will probably be issued within the next two weeks to shipyards for proposals. With the 30-day test now under way, no delay is looked for in the issue of these specifications.

Marine Engineering Corporation, with Headquarters in Philadelphia, to Design the New Cruisers

IN order to meet the requirements of the Navy Department in the construction of scout cruisers *Nos 26 to 31*, which must be built exactly alike in the essential features of design, the Newport News Shipbuilding and Drydock Company, Newport News, Va., which is to build two of them, and the Bethlehem Shipbuilding Corporation, Ltd., Bethlehem, Pa., and the American Brown Boveri Electric Corporation, Camden, N. J., which are to build one each, have organized the Marine Engineering Corporation, with headquarters in the Steel Building, 15th and Cherry streets, Philadelphia, Pa., for the purpose of operating a central designing department for preparing the plans for these cruisers. J. F. Metten, formerly chief engineer of the William Cramp and Sons Ship and Engine Building Company, Philadelphia, Pa., has been elected president of the Marine Engineering Corporation and Hugo P. Frear, formerly naval architect of the Bethlehem Shipbuilding Corporation, Ltd., has been elected vice-president.

This corporation will not only prepare the designs for the cruisers, but will also purchase certain auxiliary machinery which will be common to all the cruisers.

New Orleans Propeller Club Elects Officers

The branch of the Propeller Club, which was organized at New Orleans in May, has elected the following officers:

President—A. K. Miller, A. K. Miller Engineering Company.

Vice-president—W. E. Winship, Winship Fuel Oil Service.

Secretary—H. R. Iley, Marine Paint and Varnish Company.

Treasurer—C. A. Palmer, auditor, Sykes Bros. Steamship Company.

BOARD OF GOVERNORS

Cecil N. Bean, chairman, supervisor, U. S. Local Inspectors; Peter J. Dromgool, marine superintendent, Mexican Petroleum Company; W. J. Hardin, general manager, Marshall J. Smith Company, Ltd.; Neal M. Leach, president, Steele Steamship Company; Joseph M. Rault, member of firm, Terriberg, Young, Bault and Carrol, admiralty lawyers.

Haskelite Makes a New Record

HASKELITE plywood preeminent in the aircraft field and equally well-known in the automobile, truck, marine, bus, electric railway and sign fields, has added a new record to its string. In addition to being used in the Curtiss NC Transatlantic planes in 1919, the Douglas world cruisers in 1924 and four Loening goodwill planes just returned from South America, it has the honor of forming a considerable part of the structure of the Ryan monoplane used by Captain Lindbergh in his New York-Paris flight.

In the "Spirit of St. Louis," Haskelite forms the entire wing structure and the leading edges, and is used for almost the entire cabin, as well as other parts of the ship. Haskelite only $\frac{1}{8}$ inch thick is used for the wing beams. It is used for the leading edges because it is strong, rigid, light and easily curved to the exact requirements of the design.

Except for the wings, which were lengthened to carry the unusual load, the "Spirit of St. Louis" is a stock Ryan monoplane.

Haskelite has been standard in Ryan planes for years, as well as in 85 percent of American-built aircraft.

Two New German Transatlantic Liners Ordered

THE Norddeutsche Lloyd, of Bremen, Germany, has given orders for the construction of two new passenger boats of 46,000 gross registered tons each. One of these will be built by Messrs. Blohm & Voss, Hamburg, and the other by the A.-G. Weser, Bremen. Both boats will be designed for 26 knots and will be equipped with all the luxury and comfort which modern liners are wont to offer their passengers. On completion they will rank fourth in size among the world's passenger steamers, and for speed will not be surpassed by any others. The two new boats will be named *Bremen* and *Europa*. The costs will total something like 40 million RM for each vessel. Besides these two passenger boats, the Norddeutsche Lloyd has also commissioned the Hamburg Vulkan Werft, which recently passed into the hands of the A.-G. Weser, with the construction of two new combined cargo and passenger boats of 12,000 gross registered tons each. These will have a speed of 14 knots.

Ship Construction and Repair Bids

Bids Received for 20 River Barges

BIDS were received by T. Q. Ashburn, chairman of the Inland Waterways Corporation, Washington, D. C., on May 16, covering the construction of 20 additional barges for use on the upper Mississippi river. The barges are to be similar to those recently built by the Midland Barge Company, Midland, Pa., for the Inland Waterways Corporation.

Morse Drydock Company to Repair S.S. Jacob Christensen

THE Morse Drydock and Repair Company, Brooklyn, New York, has received the contract for repairs to the Norwegian freighter *Jacob Christensen*, whose bow was badly crumpled when she rammed the Matson liner *Malolo* in a heavy fog off Nantucket. The contract was awarded at a price of \$23,000 and will be completed in 12 days' time. Six bids were received ranging from \$23,000 up to \$30,110.

Federal Yard to Repair S.S. Steel Inventor

WITH a price of \$69,765, delivery at New York, and \$75,365, delivery at New Orleans, the Federal Shipbuilding and Drydock Company, Kearny, New Jersey, was successful bidder for repairs to the Isthmian Line steamship *Steel Inventor*, which was damaged when she went ashore off the coast of Nicaragua while en route to the Far East. Other tenders received were as follows:

Name	Price (New York delivery)	Price (New Orleans delivery)
Jahncke Drydocks, Inc.....	\$76,051	\$67,801
Todd Drydock Corporation (Mobile plant).....	74,000	70,000
Alabama Drydock and Shipbuilding Co.....		79,775
Morse Drydock and Repair Company	86,083	90,353

Johnson Iron Works to Repair Munson S.S. Munardan

A CONTRACT covering fire damage repairs to the steamship *Munardan*, owned by the Munson Steamship Line, New York, has been awarded to the Johnson Iron Works, New Orleans, La., at a price of \$30,200 and 23 days' time. Bids for the work were received and opened at Mobile, Ala., on Thursday, June 9, by Frank S. Martin, naval architect of New York. The greatest part of the work consists of plate work. All machinery and boilers are to be opened for inspection. Other tenders received were as follows:

Name	Price	Days
Jahncke Drydocks, Inc.....	\$34,000	28
Todd Shipbuilding and Drydock Company	35,190	26
Alabama Drydock and Shipbuilding Co.....	37,477	28
Bruce Drydock Company.....	38,700	30

Maryland Drydock Co. to Repair S. S. Hatteras

A CONTRACT for maintenance repairs to the steamship *Hatteras* has been awarded to the Maryland Drydock Company, Baltimore, Maryland, by the United States Shipping Board, at a price of \$7,227.

The Shipping Board has also awarded a contract for maintenance repairs to the steamship *Balsam* to the Bethlehem Shipbuilding Corporation, Ltd., Baltimore, at a price of \$7,286.

Bids Opened for Steel Hull Maneuver Boat

THE United States Engineer Office, Huntington, West Virginia, received and opened bids on June 14, for the construction of one steel maneuver boat. The boat is to have a length of 60 feet; beam of 20 feet; depth at gunwale 3 feet 4 inches, and crown of deck 2 inches. The tenders submitted were as follows:

Name	Price
Zier Boiler and Sheet Iron Company..	\$11,983
Peter Jensen & Company.....	13,530
Charles Ward Engineering Works.....	14,985
Howard Shipyards and Dock Company..	15,973
Charles Hegewald Company.....	16,889
Midland Barge Company.....	18,500
Dravo Contracting Company.....	19,800

The award has not as yet been made.

Robins Yard Gets Contract for Repairs to Tanker Catahoula

A CONTRACT for reconditioning the Cuban Distilling Company tanker *Catahoula* has been awarded to the Robins Drydock and Repair Company, Brooklyn, New York, at a price of \$48,555 and 23 days' time. Four other tenders were received for the work as follows:

Name	Price	Days
Bethlehem Shipbuilding Corporation, Ltd.....	\$54,444	20
Staten Island Shipbuilding Company	56,634	24
Maryland Dry Dock Company....	56,781	20
Morse Drydock and Repair Company	58,916	28

Bethlehem Corp. Awarded Repair Contract for S.S. J. L. Luckenbach

THE Bethlehem Shipbuilding Corporation, Ltd., Simpson plant, Boston, Mass., has been awarded a contract for repairs to the steamship *J. L. Luckenbach* of the Luckenbach Steamship Company, Inc., New York. The vessel was damaged in collision about three months ago with the British steamship *Athelfoam*. Fourteen side plates, 18 frames and 15 deck beams were damaged in the collision and will have to be replaced. The following bids for the work were received:

Name	Price
Bethlehem Shipbuilding Corporation, Ltd.....	\$22,895
Morse Drydock and Repair Company..	24,900
Robins Drydock and Repair Company....	25,985

Joseph Dingle Boat Works Awarded Contract for Cabin Cruiser

A CONTRACT for the construction of a gasoline-driven cabin cruiser has been awarded to the Joseph Dingle Boat Works, St. Paul, Minn., by the United States Engineer Office, Duluth, Minn., at a price of \$7,680 and six weeks' time. The Chance Marine Construction Company, Inc., Baltimore, Maryland, was the next lowest bidder with a price of \$7,500 and \$7,750. Four other bids were received ranging from \$7,750 to \$9,650.

Bids Received for Repairs to S.S. Western World

BIDS were opened at the offices of the Munson Line, New York, Thursday, June 23, for repairs to the steamship *Western World*. This vessel ran aground off Bahia, Brazil, recently and ripped her bottom plates for a length of nearly 150 feet. The bottom was partially patched and plugs inserted where the damage was worst, but the vessel proceeded to New York depending for tightness on her double bottom. Upon arrival in New York, she was placed in drydock at the Robins plant, Brooklyn, New York, where a survey was made of the damage and specifications issued by Frank S. Martin and Son, naval architects, 25 Broadway, New York. Three yards submitted bids on the work, as follows:

Name	Price	Days
Robins Drydock and Repair Company	\$175,840	45
Newport News Shipbuilding and Drydock company.....	187,000	75
Bethlehem Shipbuilding Corporation, Ltd	193,000	65

Coast Guard Receives Bids for Five Turbo-Electric Drive Cutters

THE United States Coast Guard, 14th and E streets, N. W., Washington, D. C., received and opened two proposals on Tuesday, June 21, 1927, for furnishing all labor and materials and performing all work for the construction and equipment of five Coast Guard cutters *Nos. 45, 46, 47, 48 and 49*. The general characteristics of the vessels are: length overall 250 feet; beam, molded, 42 feet; displacement, 15 feet mean draft, about 2,075 tons, and turbo-electric drive, single screw, shaft horsepower 3,000.

Three vessels are to be completed on or before October 31, 1928, and two on or before May 31, 1929. For the first three vessels Westinghouse propelling machinery and miscellaneous electrical equipment will be furnished by the government. For the last two vessels, contract for the machinery to be furnished by the government will not be awarded until after July 1, 1927. For all five vessels the boilers, boiler room equipment and other auxiliaries will be similar.

For the first three vessels appropriations cover the total cost and the shipbuilder may build the vessels as rapidly as he desires. For the last two vessels appropriations cover a total expenditure of about \$650,000 during the period July 1, 1927, to June 30, 1928, and the shipbuilder must

arrange his building program for these two vessels to limit payment vouchers made within said period within that total sum. The tenders received were as follows:

Name	Price For Each Vessel
Bethlehem Shipbuilding Corporation, Ltd.	\$634,500
Alternate	634,800
Newport News Shipbuilding and Drydock Company	739,000
Alternate	749,000

Newport News Company to Repair Steamship Munamar

A CONTRACT has been awarded to the Newport News Shipbuilding and Drydock Company, Newport News, Virginia, for repairs to the steamship *Munamar*, owned by the Munson Steamship Line, New York. Plans and specifications covering the work were prepared by Frank S. Martin and Son, naval architects, New York. The bids were opened on Tuesday, June 7, at the Munson Line offices. The work includes the installation of a new stern frame and bottom damage repairs. The following bids were received:

Name	Price Stern Frame and Collision Damage	Days
*Robins Drydock and Repair Company	\$19,814	23
Newport News Shipbuilding and Drydock Company	20,375	25
*Told Shipyards Corporation (Mobile)	22,000	30
Charleston Drydock and Machine Company	28,420	38
Merrill-Stevens Drydock and Repair Company	35,300	45

* In this case the bid was submitted on condition that the owners deliver the vessel at the repair plant.

Bids Received for Construction of U. S. Engineers' Inspection Boat

TENDERS were received on June 2, by the United States Engineer Office, New Orleans, La., for the construction of one 85-foot steel hull inspection boat, with the following results:

Name	Base price	Bid prices adjusted to include time element at \$25 for each additional day over 190 days
Charles Ward Engineering Works	\$62,580.00	\$59,080.00 63,080.00 64,130.00 64,233.00 59,580.00 60,400.00 60,580.00 84,450.00
Nashville Bridge Company	83,200.00	80,000.00 81,750.00 75,850.00
Charleston Drydock and Machine Co.	77,473.34 63,944.34 65,081.34	77,473.34 63,944.34 65,081.34
Howard Shipyards and Dock Company	69,743.00	70,993.00
Delaware Boat and Boiler Works	59,900.00	61,900.00 65,400.00

The award has not as yet been made.

Several Canadian steamers have been dropped at Port William because of the light movement of grain eastward. The giant steamer *Lemoyne* is at the Canadian head of the lakes.

Notes from the Great Lakes

Duluth Firm Awarded Contracts for Construction of Steel Towboat and 6 Steel Barges

A CONTRACT for the construction of a steel towboat has been awarded to the Marine Iron and Shipbuilding Company, Duluth, Minn., by the United States Engineer Office, Milwaukee, Wis.

The Duluth company has also received a contract for the construction of six steel barges for use in the Erie canal by a New York firm. The barges will be of the steel dump style and will be 100 feet long and 28 feet beam. The contract was awarded on a bid of \$185,000. Work on these boats will probably start within the next three weeks.

Vessel Owners Attend Coal Convention

SEVERAL Cleveland vessel men joined a delegation of coal representatives at the annual convention of the National Coal Association in Chicago, on June 19 and 20. Among the speakers on the closing day was H. E. Booth, sales manager of the M. A. Hanna Company, Cleveland vessel owners.

Vessel owners were congratulated upon their facilities for moving coal tonnage to the northwest this season, coal shippers and producers saying that the facilities of the Interlake Steamship Company, the Pittsburg Steamship Company, and other fleets operated by Cleveland interests are the best ever provided for moving coal and iron ore.

Steel Treating and Welding Society to Hold Combined Exposition

THE National Steel and Machine Tool Exposition will be held at Detroit, Mich., during the week of September 19 under the auspices of the American Society for Steel Treating. Ninety thousand square feet are available for exhibit purposes this year. The factory equipment exposition will cover everything from steel, raw material, heat treating equipment, small tools, machine tools, forging equipment, inspection, handling and welding materials. Approximately 10,000 square feet will be devoted to welding material and equipment, a new feature of the steel and machine tool exposition. The welding exhibit was previously an independent exposition under the auspices of the American Welding Society. This year the annual fall meeting of the welding society will be held at Detroit beginning September 19.

Personal

HARVEY D. GOULDER, for many years general attorney for the Lake Carriers' Association, has sailed for Europe to attend the convention of the Chambers of Commerce in Stockholm, Sweden. He will spend a month in London looking after marine insurance matters with which he has long been connected.

U. S. Engineer Office, Milwaukee, Awards Contract for Towboat

THE United States Engineer Office, Milwaukee, Wis., has awarded a contract to the Sturgeon Bay Shipbuilding and Drydock Company, Sturgeon Bay, Wis., for the construction of one 60-foot steel side-wheel tug, at a price of \$55,700, bids for which were received at Milwaukee on Tuesday, May 24.

D & C Steamers Begin Detroit and Chicago Service

THE Detroit-Chicago division of the Detroit & Cleveland Navigation Company, via Mackinac Island and St. Ignace, opened June 23. The steamers *Eastern States* and *Western States*, which will operate on this division, have been completely remodeled and redecorated to fit them for this attractive cruise around the lower peninsula of Michigan from Detroit to Chicago.

Bulk Freighters Held at Buffalo for Lack of Business

CORNELIUS COUGHLIN, harbor master, at Buffalo, announces that there are 22 bulk freighters in ordinary at that port because of lack of business, and private advices are to the effect that there will be additions to the waiting fleet. The grain receipts at Buffalo are lighter than at any time this season, and there are no immediate indications of improvement, vesselmen say.

The barge canal operators can get no grain cargoes and there were about 80 boats waiting here recently. Package freight east-bound and west-bound is keeping up well.

New Harbor Opened at Buffington, Ind.

FOLLOWING the official vice presidential salute of nineteen guns, the new harbor at Buffington, Ind., reported to be the deepest on the Great Lakes, the only private harbor built on Lake Michigan in twenty years and one of only three such harbors on all the lakes, was opened with impressive ceremonies by Vice President Charles G. Dawes, June 9. This waterway project marks an important step in the larger development of traffic on the Great Lakes. The ceremonies were attended by more than 2,000 guests of B. F. Affleck, president of the Universal Portland Cement Company which built the harbor.

Tug Connecticut Stationed at Lorain

THE Great Lakes tug *Connecticut*, which was built at the yards of the Great Lakes Towing Company, Cleveland, has been sent to Lorain where she will be stationed. Captain F. A. Bailey, of the steamer *H. N. Hobart*, took the tug to Lorain.

Bulk Freighters Nearing Completion

TWO more ore carriers will be added to the fleet this season. The steamer *Harry Coulby*, which is building at the Lorain yard of the American Ship Building Company for the Interlake Steamship Company, Pickands Mather & Company, managers and which will be the largest vessel of her class, will come out next month. She will be the second vessel to be named for Mr. Coulby. Capt. William A. Reed, who has sailed steamers of the Interlake fleet for years, will be in command of the big freighter, and James Brand will be the chief engineer.

The steamer *B. F. Affleck*, building for the Pittsburgh Steamship Company, was launched at the yard of the Toledo Shipbuilding Company, June 25. She will be the last of the bulk freighters ordered for 1927 delivery to come out. The self-unloading steamer *Carl D. Bradley*, building at the Lorain yard for the Bradley Transportation Company, will be completed next month. She will be operated in the stone trade.

Mishaps

The steamer *Twin Ports* went aground below Sandwich and was released by the tug *Favorite*.

The steamer *City of Ignace* hit a dock at Cleveland and was damaged and sent to a shipyard for repairs.

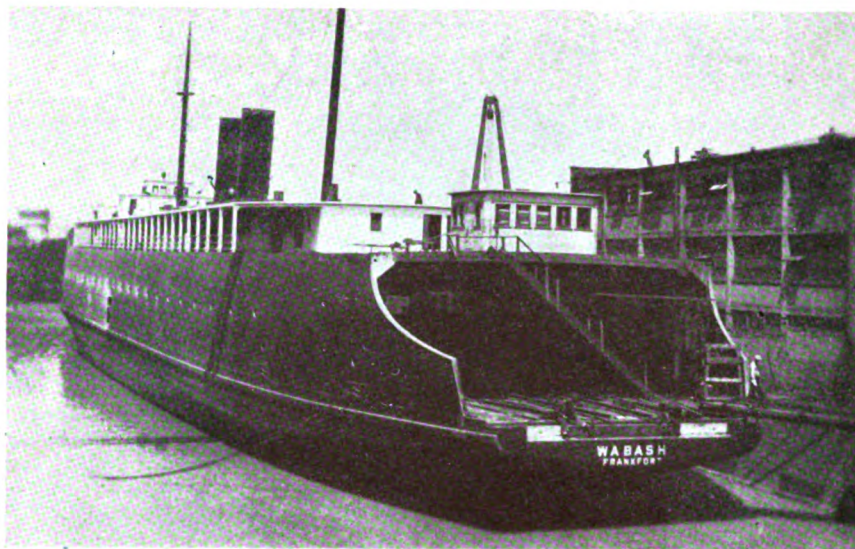
The ferry steamer *Algoma* is now plying regularly between Mackinaw City and Mackinaw Island.

The steamer *Sierra* which went aground on the west bank of Lime Kiln Crossing had to lighter a cargo of coal. The lighter *Rescue* went to the vessel's rescue and she was sent to a shipyard for repairs.

The steamer *Keyport* went aground at the Hocking Valley dock in Toledo and the tug *Louisiana* had to release her after she had lightered her coal cargo.

The steamer *Zenith City* has been docked at Cleveland for repairs. The Lake Erie shipyards are now doing considerable repair work. Most of them report a good run of contract work since the opening of navigation this season.

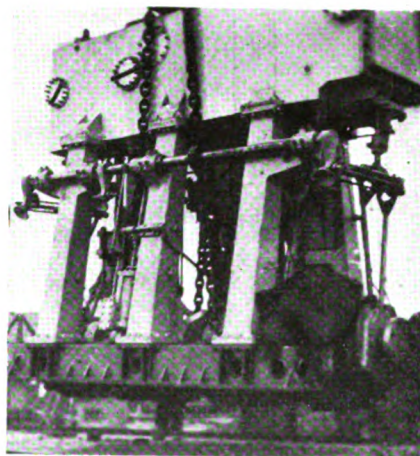
The steamer *William Livingstone* has been drydocked at Ashtabula for repairs. She had several plates damaged.



Car ferry Wabash just after launching

Ann Arbor Car Ferry Completed

THE twin screw steel car ferry *Wabash*, built by the Toledo Shipbuilding Company, Toledo, Ohio, for the Ann Arbor Railroad Company, Frankfort, Michigan, was completed last month. The



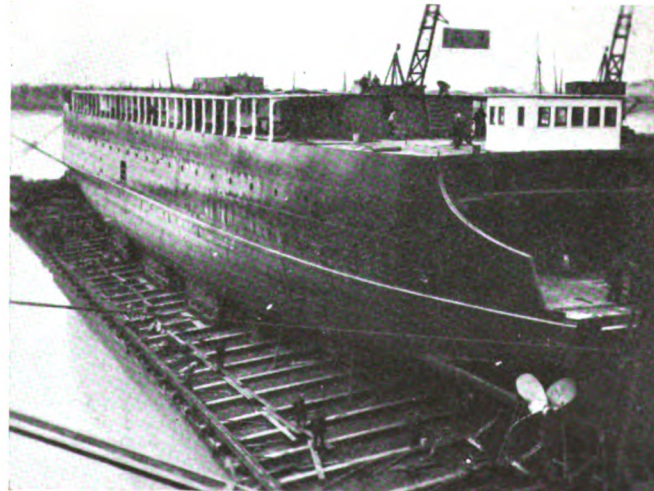
Port engine of the Wabash

Wabash is 380 feet long overall, 368 feet long between perpendiculars, 57 feet 6 inches molded beam and 21 feet 6 inches depth to main deck. The vessel has two complete decks, a main deck on which are four tracks for carrying cars and a shade deck for the accommodation of the crew and passengers. The hull is of single bottom construction, subdivided into eight watertight compartments by seven watertight bulkheads extending through the lower hold space. The machinery is located amidships.

Propulsion is by two triple expansion engines, with cylinders 20½ inches, 34 inches and 56 inches diameter by 36 inches stroke, driving twin screws. Steam is supplied at 185 pounds per square inch by four 3-furnace single ended Scotch boilers 14 feet 6 inches inside diameter by 12 feet overall length operated under Howden's forced draft. The boilers are coal-fired and each has a heating surface of about 2,750 square inches.

The engine room auxiliaries include a jet condenser common to both main engines, 2 steam driven condensate pumps; 2 feed pumps; 1 general service pump; 1 bilge pump; 1 centrifugal ballast pump; 1 sanitary pump; 1 cooler pump; 2 fresh water pumps, and a feed water heater.

The plans and a description of this vessel will be published in an early issue.



Views of the car ferry Wabash just before launching at the yards of the Toledo Shipbuilding Company

Auto-Valve Lightning Arresters Price Reduced

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The price reductions announced include a 10 percent reduction in high voltage station type lightning arresters; a reduction of 5 percent in low-voltage station arresters of 73 Kv. and less, and a cut of from 3 to 7 percent in type LV distribution A. C. arresters.

Douglas Fir Selected for Rebuilding the Constitution

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American Marine Standards Committee. Chairman, Colonel E. A. Simmons. Secretary, A. V. Bouillon, Division of Simplified Practice, Department of Commerce, Washington, D. C.

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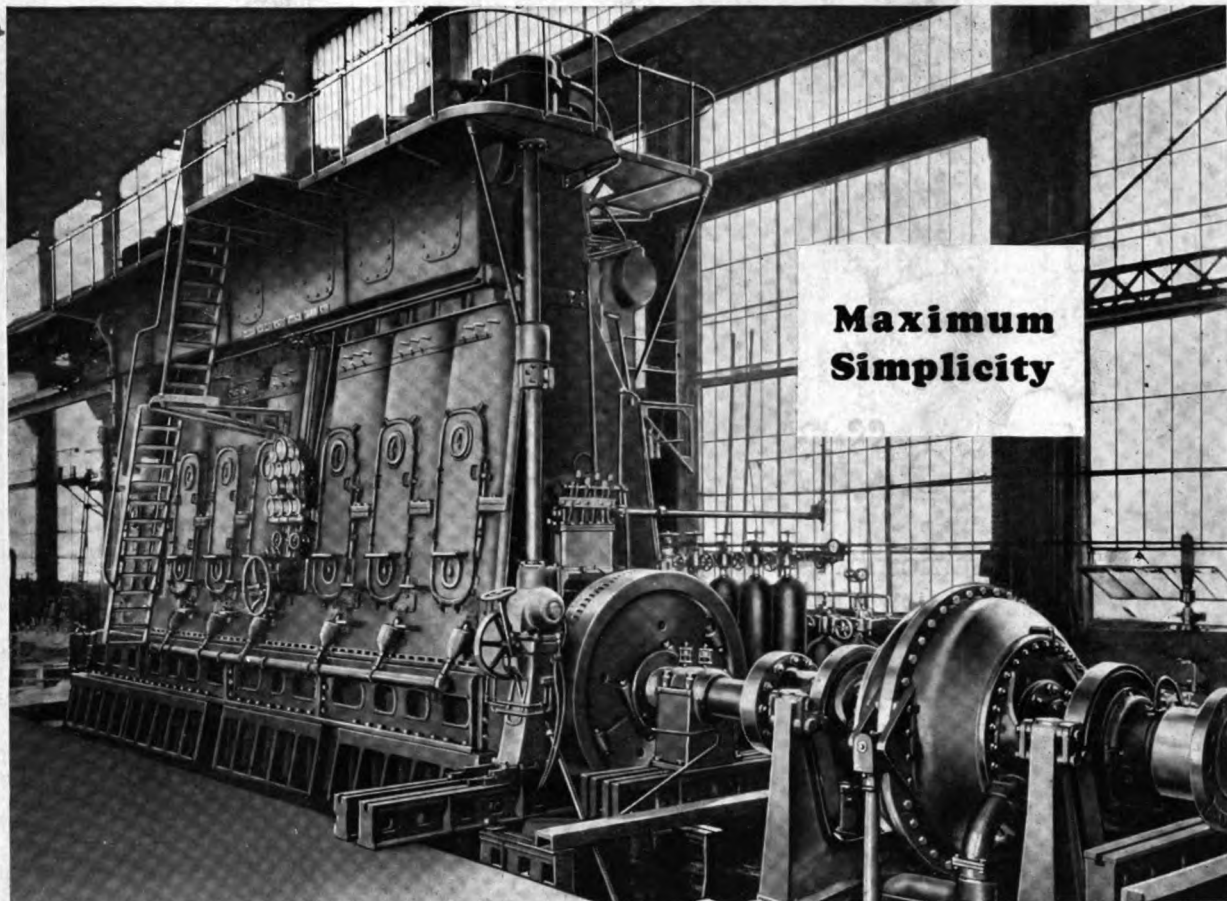
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Collegio Degli Ingegneri Naval e Meccanici in Italia.

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Marine Engineering and Shipping Age



3000 B.H.P. BUSCH-SULZER DIESEL SUPPLIED U. S. SHIPPING BOARD

**MAINTAINED THE LEADERSHIP
OF
AMERICA'S OLDEST DIESEL BUILDER**
[THIRTY YEARS' EXPERIENCE 1897-1927]

30-Day Shop Test	Contract	Performance
Fuel per BHP Hr.	.43 Lbs.	.406 Lbs.
Mechanical Efficiency	72.0%	74.4-77.9%
M.I.P. lbs. per sq. in.	85.0	80.7
Weight (reduced)	1,000,000 lbs.	850,000 lbs.

BUSCH-SULZER

Busch-Sulzer Bros. Diesel Engine Co., St. Louis, Mo., U.S.A.

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